

# THE TRANSACTION COSTS THEORY AND ITS APPLICATION TO BIOETHICS: THE CASE OF TRANSGENIC SOYBEAN PRODUCTION IN BRAZIL

Sônia Barroso Brandão Soares<sup>†</sup>

Keywords: GM – regulation – transaction costs – Bioethics

Contents: 1. Introduction. 2. Research methodology and theoretical fundamental supports. 3. The relationship between transaction costs and biotechnology. 4. The precautionary principle and its implications to the theory of transaction costs. 5. The case of regulating genetically modified soybeans in Brazil and the transaction costs' overlap. 6. Concluding remarks. 7. References.



## 1. INTRODUCTION

Biotechnology is the field of science where there is the growing importance of the interaction between the worlds of science, technological research and industrial and agricultural production. More than any other modern productive activity, the nature of OGM research in biotechnology is focused on the pursuit of the kind of innovation that makes smaller the frontiers of science and technology but also gives place to many ethical questions related, not only to the methods used

---

<sup>†</sup> PhD UFF/Brazil

for analysis, but also about possible risks to human beings and the environment, directly related to the new technologies implemented. So it is that there is several optical analysis of the problem, not only by the aforementioned sciences (C & T), but also for social sciences applied (law and economics) in an interaction sociological and even anthropological phenomenon, to justify and explain the process involving the biotechnology regulatory framework that will be applied.

Because of its close connection with scientific activity, biotechnology is classified by economists as a science based sector (Bell and Pavitt, 1992), where the factory floor is the very technology research lab. More: the discoveries of biotechnology are the result of a systematic combination of various knowledge – biology, informatics, law, ethics etc. In this sense, one can define biotechnology as a block of knowledge and information technology, combining research methodologies and protocols used in the cell biology study , genetics, biochemistry, among other matters, with new scientific concepts, derived from disciplines that did not exist a few years, such as molecular biology, functional genomics and proteomics, and also with the computer science and information. (Fonseca et alli, 2004)

The economic and legal transactions involving biotechnology production, especially the production and comercialization of GM, seeds ant their derivatives raise a number of questions that go way beyond the basic ethical principles. In fact, companies that are engaging to both the research and the production and marketing of GMO's in the specific case of this article, of genetically modified soybean seeds (Roundup Ready), will establish a level much closer to the hiring market values (ethics of profit and dissemination) rather than from axiological basis of ethical principles that should support the regulatory content (such as the precautionary principle and the principle of non-maleficence).

Even when one biotechnology is introduced in a timely manner (by exploiting a single type of agriculture – corn or soybean seeds and its variants) new issues such as managing/monitoring environmental risks and prevent consumption accidents can emerge. This is the diffusion process case of Monsanto's resistant to glyphosate-based herbicide (Roundup) soybean seeds in the Brazilian's agricultural production, which, in the spent of five years, has evolved from modest 3 million acres, in 2003, that represents approximately 2% of Brazilian's cultivated area., to 180 million acres in 2008, about 64% of the total cultivation area in Brazil, representing an estimated \$ 7.3 billion profit per year for Monsanto, the largest seed producing and selling company<sup>1</sup>.

Eventually, this diffusion replaces the idea of regulation as a pre-existing transaction cost (*ex ante*) for a subsequent (*ex post*), requiring the making of royalties contracts, on the new technology ranging, for the GM seed's patent holder's<sup>2</sup> payment (represented by the introduction of the gene that makes it resistant to glyphosate-based herbicide), to circumvent rules that the problem of linking and use of the brand of herbicide, also produced by Monsanto Group, to the use of transgenic seed, which, according to Brazilian Law, according to Law 8078/90, the Consumer Protection Code, would be an abusive practice - for joined saling - since it violates the rights of consumers to free choosing).

Therefore, the regulatory process set aside the farmer as a consumer, considering genetically modified seeds and herbicides as agricultural inputs (goods of the production chain used to obtain the final result, the harvest), turning farmers into

---

<sup>1</sup> Data from the article "The GM seeds have already proves their value for agriculture" (Source: R. G. Ferreira. Isto é Dinheiro, 01/08/2010 and [www.portaldebranding.com](http://www.portaldebranding.com))

<sup>2</sup> The original patent of the GM seed's resistant to glyphosate-based herbicide belongs to Monsanto, expired in United States in 2001,

suppliers, jointly liable with the company for accidents consumption.

Concurrently, the contracts were designed with “exclusivity” and “non-reuse seed from one harvest to another” clauses to provide to the company a greater supply of its products. The same company that also helped with the \$ 290 million fund and \$1 billion investment to biotechnology research conducted both by EMBRAPA (Brazilian’s Agricultural Research Corporation) and subsidiary and biotechnology companies – acquired, in Brazil by Monsanto itself, such as AlellyxeCanaVialis,– , only in the years 2006 to 2008. (RYDLEWSKI et alli, 2010)

This marketing strategy has discouraged competing companies, which have developed glyphosate-based herbicides, to offer its products to farmers already “captured” by Monsanto’s contracts. Reinforcing this view, the very Patent Law of Brazil, Law n. 9.279,1996, predicted in its article 230 the kind of patent “pipeline” that would give a survival rate of patents filed abroad, who were about to expire, as has occurred in 2001 with the rank of Roundup, the Monsanto’s GM soybeans’ herbicide being sold. This article, however, has its constitutionality been argued today in the Supreme Court (STF) that tends to recognize it based on the constitutional principle of free competition.

Given this brief summary of the key facts and issues raised by GM seeds’ introduction in Brazil, this article aims to elucidate the initial notes on the argument that the regulatory process itself (and the contracts it requires) has transaction costs that can generate other costs such as monitoring and certification, risk management and repair of damage (cost of preventing failures in the contract) and labeling (garantee of the right of consumers thoroughly information to choose). These costs will directly influence the profitability calculation of biotech products when offered to the market.

Thus, this paper will make a brief presentation of the theory of transaction costs and its applicability to biotechnology and bioethics, having as basis the work done by R. Coase and O. Williamson over a perspective of economic analysis of the regulatory process on the transgenic soy's production in Brazil over the period of 2003 to 2008, once approved the Brazilian Biosafety Law (Law n. 11.105, 2005), because only after this point the data become official (IBGE statistical data) and publications in the area of Economic Policy and Law, especially the New Institutional Economics. Although genetically modified soybeans have been grown on Brazilian's soil since 1996, when they were smuggled from Argentina, which was already producing in large scale since 1990.

Follows a brief study made of the precautionary principle to show, eventually, that it can also be taken as a parameter to the application of the theory of transaction costs in the case of the transgenic soy production in Brazil and its developments (mandatory labeling and certification of non-GM crops in order to export mainly to Europe).

## 2. RESEARCH METHODOLOGY AND THEORETICAL FUNDAMENTAL SUPPORTS

The article presented here is theoretically supported in the works of H. Jonas, R. Coase, O. Williamson and a doctoral thesis developed and defended by the author in 2007, whose central theme is the Civil Liability for Accidents with Food Consumption / Transgenic Seeds as a Result of the Regulatory Process, for the degree of Doctor of Law and Economics at Gama Filho University, Rio de Janeiro, Brazil.

The methodology used is the analytical approach of texts and statistical data for the bias of political economy applied to regulatory law, support of the New Institutional Economics

(NIE), which main expression is the transaction costs' theory.

This paper is linked to the proposed theme for the 5th. Postgraduate Conference in Bioethics because it represents a new methodology to approach the issue of biotechnology, emphasizing the close relationship between economics, law, scientific research, technology and society. Here, far beyond being based on Bioethics and its principles, biotechnology is a purpose in itself, the purpose to help protecting people against potential economical and health damages.

### 3. THE RELATIONSHIP BETWEEN TRANSACTION COSTS AND BIOTECHNOLOGY

The use of the term “institutional economics” features when a theory or approach is something that has been developed since the 1930's, when T. Veblen, J. Commons, M. Weber developed their studies in contrast to classical economic theory (A. Smith), focused on market forces, with the main point centered in the idea that “institutions” – Government, contracts and market – interact to promote the production process. However, the “old institutional theory” does not demonstrate its applicability by means of examples and empirical data which NIE<sup>3</sup> does. (Baslè, 1993)

For this reason, an inovating group of economists will defend the idea of Economy's functionalization, creating a theoretical alternative way, taking as bases/ground the notion of institution. This theory, New Institutional Economics (NIE), would focus the Transaction Costs Theory (TCT), whose exponents are R. Coase, O. Williamson and D. North.

The institutions, in the perspective of New Institutional Economics, are studied at four levels. The first, more general and stable (embeddedness), analyzes the formal institutions such as religions, the state, and informal norms, traditions and

---

<sup>3</sup> Compression of the terme New Institutional Economics.

customs. This is the object of research in economic history and sociology. The second level is called the institutional environment, which deals with the formal rules that mediate the relations between economic agents. Examples of such institutions are the judiciary, the state's institutions bureaucracy and property rights. The third dimension, called the governance or transaction costs economics, studies the costs associated with economic transactions. The assets and potential human behaviors are the ones which combined will account for the structures of governance. The fourth dimension is the neoclassical economics, in which the focus was on production costs to the firm incurring in the preparation of goods and services. At this level economic relations of buying, selling, pricing and quality concerns are manifested. (Belik et al., 2007)

It is exactly the third dimension that guards relations with this study. Led by R. Coase (*The nature of the firm*, 1937), this theory was founded by his disciples O. Williamson and D. North. In his work, Coase says that in the real world, many transactions take place inside the firm, not adopting the coordination of market relations as A. Smith once proposed (the ruling invisible hand of the market). Coase then adopted the firm and the market as alternative means of coordination. For the author, the firm's existence is justified because of the cost in the adoption of pricing in the solution of the transactions. The price mechanism's use is costly because it is costly to recognize what the relevant prices are and also because there are costs in negotiating and concluding a separate contract for each transaction. Instead, the big firms choose membership contracts (massive ones) and not partial or individual ones.

Coase believes that the biggest the number of firms in an environment of low uncertainty, the greater the efficiency of transactions. He said "the offer price of one or more factors of

production may rise, because the other advantages experienced by a small firm are greater than those of a large firm.” (Coase, 1988:46)

Concerned by the hierarchy issues, O. Williamson notices that the goal of the TCT is to understand the various company and market's structures' origins and functions, for example, the economic institutions of capitalism. (Williamson, 1985). The object of study are the institutions (markets, firms and contracts) to learn how to interact to solve problems related to transactions, since, as stated by Coase, the use of market mechanism entails costs.

In this line of reasoning, the whole transaction is the transfer of goods or services between agents that are separated by technologically distinct production steps. Transactions are subject of study because TCT has to consider the costs associated with the task to plan, adapt, execute and monitor what is being traded. So that capitalism's institutions will work to reduce transaction costs.

Also, the firm, according to supporters of the TCT, should be treated as a governance structure. In a governance structure, the goal is to ensure coordination (with or without market's presence) to save transaction costs and reduce uncertainty, compensating the agents of bounded rationality and opportunism. (Belik et alii, 2007)

Contrary to what was preached before in terms of the mainstream neoclassical theory, which held that there was a prior knowledge of all objectives to be achieved with a given transaction and all relevant information about what would be traded (substantive rationality), TCT adopted the concept of bounded rationality, suggesting the existence of a limitation in cognitive rationality of transactors with consequences for economic activity. There is also the uncertainty's issue as an essential element.

The bounded rationality is to determine three things: the

uncertainty (because it is too costly to identify and predict future events and the solutions for such events – *ex ante*), the neurophysiological limitations of language (the human mind's limitation to receive, store, retrieve, process and analyze information without errors) and the humans' inability to express their feelings and desires through words in a given contract, and, finally, complexity (there is an impossible cost for firms to lay down all their decisions' possibilities and consequences).

TCT also develops the idea that in all the relations between economic agents there is room for potential opportunistic behavior since, in pursuit of their self-interest, people do not always conduct themselves in a transparent and honest way as defined by Williamson:

For expediency of opportunistic behavior I understand the pursuit of self-interest with guile. This includes but certainly not limited to more blatant forms, such as lying, theft and fraud. Opportunism involves mostly subtle forms of deception. Both in active and passive as the types *ex ante* and *ex post*. (Williamson, 1985:46)

Opportunism causes uncertainty because transactional relationships may involve insider information dealing or distorting the real one, which entails the possibility of knowingly false promises regarding expectations of future conduct, that is, information asymmetry among economic agents (supplier and consumer), which makes it possible for one in transaction, knowing/not knowing important goods/services' aspects traded which ends up masquerading the real product or service's quality.

Exactly there lies the application of TCT to contracts between farmers and the transgenic seeds' distributors (biotech industries). Because it is an absolutely new technique with little or none field trial – a laboratory that is better prepared does not

reproduce the climatic and physio-chemical soil where the seed will be planted – usually can bring unwelcoming surprises, such as an increasing herbicide application's need in weeds' proliferation (eg Buva) that become resistant by natural adaptation. Or even a low quantity of the harvest due to drought or frost.

That is, insofar as the fundamental problem is the transaction, not the scarce resources' application, and those are done through contracts. The concern of transactors (producer/company/state) is to ensure the preparation and execution of sufficiently tailored contracts to the rationality and adaptive to environment and opportunistic behaviour's uncertainties' limitations. The contracts, which are transaction costs *ex ante*, aimed to prevent or minimize future costs, appear as transaction costs *ex post*, because it is very difficult to prevent a product's damage which has already been sold and counted with the soybean producers loyalty in terms of experience.

In this case, there is an overlap between the *ex post* costs (control, monitoring and judicial settlement of conflicts) with the *ex ante* ones. This is because the Brazilian's regulatory process on the transgenic soybean's production has already occurred based on one fact: the genetically modified soybeans had been grown and distributed in violation of the law and the rule in many parts of the country. It would be impossible to anticipate all costs, making the full contracts, with total asymmetric information (the studies on the Roundup Ready soybeans' production came from the United States and Argentina, without proper environmental impacts' reports in Brazil) and also the opportunistic behavior both from farmers, wondering at the higher profits' possibility, without extra charges, and the companies distributing genetically modified seeds omitting relevant information about the biotechnological processes developed and the effects on agriculture in a large

scale (asset specificity). These, having graciously distributed their products at first, as an experiment, were actually spreading the product more and more, forcing the adjustment and acceptance by the state, creating a true condition of capture.

#### 4. THE PRECAUTIONARY PRINCIPLE AND ITS IMPLICATIONS TO THE THEORY OF TRANSACTION COSTS

The principle of the principles in the biotechnology's area is the precautionary that would inform the conduct of legislators – and the state in general – and researchers – specifically – asking them always to preserve humanity and the environment from irreparable damage, monitoring researches and making the results be published to assess the impact of using genetically modified products for consumption by animals and people, being constantly monitorized by public agencies responsible for their release for consumption. Also linked to that principle would come the one associated to the right consumers have to receive relevant information about what is exposed to be sold in the market. Therefore, the idea of mandatory labeling GM products when the product is released to be consumed.

Mandatory labeling is the relation between the right consumers have of receiving information (rural producers and consumers) and the constitutional principle of human dignity. The CDC (Law 8.078, 1990 – Code of Consumer Protection) in its 6<sup>th</sup> art. states that the consumer has the right to receive secure and wide information about products and services and it is for government agencies to ensure that the same is provided. However, dealing with the GM issue such information should not be limited to the labeling, just as happens with the cigarette packs. There must be an awareness campaign among the

population and maintenance of compulsory EIA/RIMA's, already referred to in the 1<sup>st</sup> paragraph of CONAMA Resolution (National Environmental Council) dated from 23.01.1986 and also in the Constitution of 1988 (art. 225, IV) and the Convention on Biodiversity – ECO/92, that took place in Rio de Janeiro, 5<sup>th</sup> to 14<sup>th</sup> of June, 1992, that Brazil has ratified and adopted as a parameter for the protection of the environment emphasizing the precautionary principle.

However, the Decree 1.752, 1995 which regulates Law 8.974, 1995 (the first Law on Biosafety), in his 2<sup>nd</sup> art., XIV, left to the CTNBio discretion (National Technical Commission on Biosafety) to require them, if deemed necessary. Strange that a legal system, although it has its top fundamentals in the Constitution requiring the completion of EIA for all activities potentially dangerous to the environment and people's health, may approve a constitutional standard infrastructure that can disregard it.

The precautionary principle appears as a new understanding of what constitutes progress. Fundamentally modern, but emerged in the 80's, in the World Declaration on Climate, at the constitutional level, the precautionary principle turns out to be acknowledged by peoples all over the world by the Chart of the Environment of France, enacted on 02.03.2005, which in its art. 5 states that “when execution of an injury, even before the uncertain state of scientific knowledge, could affect so severely and irreversibly the environment, public authorities shall ensure, through the application of the precautionary principle and the areas of their powers, the producers' implementation for risk assessment and the adoption of provisional and proportionate measures in order to prevent the occurrence of the damage. he refers to a distrust of the results of new technologies, particularly derived event ever in history (if Thalidomide, for weapons use of nuclear energy, research on humans in Nazi's concentration fields, nuclear

accident in Chernobyl etc.).

The precautionary principle expresses a social demand framing the risks of uncertainty of the biotechnology research's achievements. The principle refers then to acceptance by the population of the uncertainties about the consequences of an action. It imposes conduct regarding environmental protection, health, or more generally, the safety of people within the context of development which is at present. Anyway, it is guided into the larger goal of sustainable development.

Brought to light in the 80's in Germany, the precautionary principle goes back to a philosophical tradition that points out the idea of prudence as enunciated by Aristotle in *Nicomachean Ethics*. The notion of caution stems from the Latin verb *praecavere* (be careful) and stimulates the attitude of being cautious. Latin associated with the notion of prudence would the idea of *phronesis* (collective virtue) that underlies the idea of security duty, the foundation of Aristotelian philosophy. Aristotle, in fact, sees prudence as a junction point between ethics and politics. The precautionary approach fits perfectly within the prudence's framework for the formulation of public policies to regulate both the biotechnological production as the land use (environmental preservation).

Nowadays, however, the precautionary principle has a new format derived from the philosophical work of Hans Jonas (1998), who proposed the idea of an ethics of anticipation and introduces a duty to protect future generations and appeals to our moral responsibility. However, the philosophy of Hans Jonas focuses the precautionary principle in an economic parameter of action, and not as a duty of abstention, for example, one should not act preventively and to refrain from causing harm, because the risk is predictable, however, inevitable when one completely ignores the data for both (the information asymmetry and bounded rationality).

It is said that the model of the precautionary principle is

anticipatory because it combines two existing models, the dressing, based on repairing the damage, and preventive, based on the investigation and the likelihood of damage. (Bechmann, P. & Mansuy, V., 2002) The association of this principle to the civil liability has already made itself felt in seventeenth-century work of Jean Domat, which asserted that any work or task which, in its development, could cause injury to any person should be preceded by a court of precaution to avoid irreparable damage. (Domat, 1996, quoted by Bechmann, P. & Mansuy, V., 2002)

However, liability evolves into an essentially severance, back in the late nineteenth-century, and lost sight of the precautionary principle. This hypothesis is confirmed by the polluter-pays principle which interferes with civil liability for environmental damage, reinforcing the logic of the damage and not prevention of its occurrence. If everything is repairable, everything is reversible. However, the precautionary principle operates precisely on what is irreversible, so irreparable. There is thus an inverse of logic by anticipation and not prevention, moving to a cost of hiring (*ex post* cost) over something which should be a cost *ex ante*.

Finally, the precautionary principle is aimed at strengthening various other devices in the legal system, such as the principles of proportionality, the right to information and the obligation of prudence and beneficence (nonmaleficence), especially in developing new standards, such as labeling mandatory for final consumption products containing up to 0.4%ppm transgenics. It refers to commands of risk assessment, preparation of environmental impact studies and risk management: providing research data to assess any problems in placing products in circulation, vigilance on already available in the environment (cost monitoring), and even suspension or revocation of authorization for production and marketing of potentially harmful products (cost of drive).

(Bechmann, P. & Mansuy, V., 2002)

Exactly why the precautionary principle brings the inherent idea of avoiding potential harm in the future by conducting environmental impact studies and thorough testing to avoid the accidents of consumption, it is associated with the Theory of Transaction Costs to be exactly the basis of preparation of any contract or regulatory act on the GM seeds' production and marketing. It will make the information asymmetry between the transgenic seed's producer (supplier) in general, large biotechnology corporations, and consumers (farmers and consumers) to be verified in order to build a frame where safeguard clauses are written to prevent the formation of monopoly abusive clauses and non-compensating-based-on theories of civil liability except such as the "current state of the art".

Now, if there is production, there is an expectation of profit, if it is inside a capitalist economy, the firm's risk (*ex post cost*) belongs to the product or service's supplier and not the consumer, the vulnerable party in consuming terms.

There is also a change in the fundamental TCT fundamental principles logic which is based on hiring. In the classic contractualism the freedom of choice principle of is the one which provides the grounds for contractual relations, and not the good faith or the social function of contracts, which derive from an adaptation of the contracts' space to the principle of human dignity, the central point of Brazilian law, the constitutional basis (1<sup>st</sup>, III Federal Constitution, 1988). Functionalization of the contracts for the transgenic seeds' distribution meets the precaution and nonmaleficence's perspective as the bioethics' foundations.

If the precautionary principle is well presented, regulators may evoke it at any time that evidence of failure in the monitoring of possible risks of production requires new tests to be made or even proposes the suspension of trading to

prevent further damage, avoiding thus other costs driven by the broken promises made in hiring. A good example would be, now that there is the presence of Buva weeds in large amounts in GM soy harvest, especially in the state of Rio Grande do Sul, with a increasing need for application of herbicides, as a precaution, to suspend the distribution of GM seeds to determine precisely whether there was, in fact, the reduction of production costs and demanding accountability from the supplier to bear the additional costs (externalities) not provided contractually. Or even be a compensation payment of royalties until there was a solution to the problem of increased need for manpower and herbicides to contain the spread of weeds.

## 5. THE REGULATORY SYSTEM OF TRANSGENIC SOYBEANS IN BRAZIL AND THE OVERLAY OF TRANSACTION COSTS

Brazil began to discuss the Biosafety issue in the early 80's, when it adopted its first environmental law (Law 6.938, 1981), defining in its 4<sup>th</sup> and 9<sup>th</sup> articles, III and VII and I, II, III and IV the objectives and policies to be developed to avoid environmental damage and establish responsibility measures.

Later, Resolution N.1 of 23.01.1986, the National Environment Council (CONAMA), in its 3<sup>rd</sup> article, defined the obligation of conducting studies and Environmental Impact Assessment (EIA) to be submitted to IBAMA (Brazilian Institute of Environment and Renewable Natural Resources) for the licensing of activities which, by law, were due to federal authorities. This includes the biosafety and seed production and marketing's issues of genetically engineering (transgenic cultivar).

Also the Resolution N.11 of 18.03.1986, in its 2<sup>nd</sup> article provides, for the 2<sup>nd</sup> article's inclusion, XVII, on Resolution N.1, and require the preparation of also Environmental

Studies over Impacts and Environmental Studies over Impacts Reports for agricultural projects, covering areas up to 1,000 acres or smaller, in this case, when dealing with significant areas in terms of percentages or importance over the environmental point of view, including the areas of environmental protection. Paradoxically, in 2006, the Provisional Measure N.327, 31.10.2006, regulated by Decree 5.950, 2006 the same date, released the genetically modified seeds' planting , transgenic cultivars, in the surrounding areas of environmental conservation.

In 1992 he was held in Rio de Janeiro, the United Nations Conference on Environment and Development (UNCED or Eco-92). This conference approved the Convention on Biological Diversity (CBD), representing a milestone in addressing the issue on the conservation, preservation, and use of biodiversity research in Biotechnology.

Fruit of the agendas and protocols ratified by Brazil in the Convention in 1995 the country approved the first Biosafety Law (Law 8.974,1995), regulated by Decree 1.752,1995, creating CTNBio (National Technical Commission on Biosafety), a deliberative body bound the Science and Technology Ministry (MCT) to consider and give a conclusive opinion on applications for implementation of research and marketing of genetically modified crops or drugs. The commission was established in 1996. It is worth saying, however, that the creation of CTNBio was indeed regulated by the advent of the Provisional Measure 2.191-9, 23.08.2001, which did enter the Law 8.974, 1995, article 1-A, defining the roles of the CTNBio. It is to observe, then, that the Commission produced several reports and resolutions between 1996 and 2001 without a referendum law to do so. Which means that hiring involving the genetically modified seeds use made between the companies that distribute seeds and farmers

in the established period had no specific legal parameters by, putting forward a transaction cost that would be the *ex ante* predictability environmental impact and the resulting civil liability for damages as the cost of hiring. However, all the “opinions” of CTNBio were welcomed by the new Biosafety Law (Law 11.105, 2005) and binding to other organs in their deliberations.

Unsatisfied with the way the discussion was taking on GM in Brazil, some non-governmental organizations came out in defense of consumers through the courts. So it is that back in 1997, Greenpeace Brazil’s Public Civil Action filed in the face of the Federal Government in an attempt to clarify the characteristics and risks GE crops for human consumption. With such a measure requiring mandatory labeling of all derivatives of GM Soya, Greenpeace managed to derail – because of fears of consumption – the import of 1.500 tonnes of GM Soya made by the Brazilian Association of Vegetable Oil Industries, to be processed in early 1998.

In 1998, through Notice N.54 of 29.09.1998, CTNBio released without the requirement for preparation of Environmental Impact Report and Environmental Impact Assessment (EIA), following consideration of Case N.01200.002402 / 98.60, at an extraordinary meeting held on 24.9.1998, where the Monsanto Company was interested in the use, on a commercial scale, of the growing of genetically modified Roundup Ready, “not find evidence of risk to human health or animal or the environment”; use later regulated by Normative Instruction N. 18 of 15.12.1998. (SOARES S.B.B., 2007)

However, the same year, was received at the 11th. Stick Federal Judicial Section of the State of São Paulo, Case N.1998.34.00.027681-8, Class 9.200, with subsequent decline of competence for the 6<sup>th</sup>. Federal Court of Brasilia, a Preventive Action promoted by IDEC (Brazilian Institute for

Consumer Protection) on joinder with the Civil Association Greenpeace and IBAMA in Brazil, being in the passive role the Federal Government, the Monsanto Company and Monsoy Ltda. The Latter, an argentinian subsidiary of Monsanto. The cause was upheld by Federal Judge Antonio Souza Prudente Holder with Judgement delivered on 10.08.1999, suspending, on precautionary principle, production and marketing behalthroughout the country, the Roundup Ready GM soy, for lack of proper regulation and because there has not been done prior Environmental Impact Assessments (EIA) as required by article 225, IV of the Constitution of 1988, reiterated in it's 3<sup>rd</sup> article. CONAMA Resolution N. 237, 19.12.1997.

Worried about the unfolding events, the media presented the existing controversy about the planting, especially in the south, transgenic plants, such as Roundup Ready soybeans, the Bt corn and High-Oleic Canola. Authorities have now expressed prohibiting the planting and cooling the inspection, either by preventing it to occur.

Later on, Law N.10.165, 27.12.2000, section VIII added to Law N. 6.938, 31.08.1981, transposing into the formal legality of the forum material related to the “natural resources”, as contained in Annex I to CONAMA Resolution N. 237, 19.12.1997, which subjects to environmental licensing, considering them as potentially polluting activities, the use of natural genetic heritage, the introduction of exotic or genetically modified crops and the use of biological diversity by biotechnology. (SAGE A. S., 2004).

The first release of a statutory body has been genetically modified in 2003 with the enactment of Law N. 10.688, 13.05.2003, when the harvest of Roundup Ready was released for sale as grain until January 31, 2004. Fruit of the MP-131, 25.09.2003, aimed at the transgenic crops' planting and harvesting liberation in 2004, although derived from seeds that had entered the Brazilian territory, mostly smuggled from

Argentina in the period in which guards the extent aforementioned injunction, halting the production and marketing of such products, under the reasoning of having a fait accompli and the loss of farmers may be infinitely greater with the statutory prohibition. This event highlights the transaction costs' overlap, since the regulation came after the event itself, contrary to economic TCTs logic in the regulation that would be an *ex ante* cost (by the rules of contract) and not an *ex post* cost, as it became.

In later years, new legal clearances for genetically modified soybeans' planting and marketing were held: in 2004 by Law 10.814 (converted into law of MP-223, 9.12.2004) and in 2005 by Law 11.092. In these years, farmers who had been planting transgenic soybeans had signed a Declaration of Commitment, Responsibility and the Conduct Adjustment (TAC) with the Agriculture, Livestock and Supply Ministry(MAPA), based on Decree 4.846, 9.25.2003, which is regulated in the MP-131, 2001, 3<sup>rd</sup>'s article, defining the area, the location of planting and farmers' responsibilities arising from the biotechnology use.

There followed a discussion on the Draft Biosafety Law (PL-2.401,2003), today approved and processed with vetoes in the Law 11.105, 24.03.2005. The law sets standards and mechanisms for supervision of genetically modified organisms (GMOs) and their derivatives' construction, cultivation, production, handling, transportation, transferring, saling, importing, exporting, storing, searching, consuming, releasing and disposing to protect life and human health, animals and plants, as well as the environment (article N. 1), and have applied to those potential causes of environmental degradation, the provisions of Law N. 6.938, 1981 (which regulates the National Environmental Policy) and its regulations as an effective way of prevention and mitigation of threats to human health and environmental degradation,

observing the principle of precaution.

However, this law recognizes as valid the CTNBios opinions previously issued, even without a parameter defined as the legal enforceability or otherwise of the EIA / RIMAs<sup>4</sup>.

Meanwhile, Brazil became a signatory to the Cartagena Protocol on Biosafety, which central objective was to create biodiversity protection's mechanisms against the damage that could result in biotechnology products.

As it was intensified the planting of transgenic soybeans in the country, its presence in food and finished products intended for human or animal consumption also increased. Soy participates in the composition of most products are marketed nationally, and its addition occurs in the natural grain or as protein, fat, oil, extract or lecithin. Therefore, foods containing genetically modified organisms came to be consumed in large amounts, both in Brazil and in many countries, often illegally or without the knowledge of the consumer.

Thus, it became necessary to standardize the questions concerning the right to information, provided by the Consumer Defense Code (Law N. 8.078,11.11.1990). According to article N. 31, provision and presentation of products should ensure correct, clear, precise language, also inform about its qualities, quantity, composition, price, warranty, duration and origin as well as the risks that presents to the health and safety of consumers. Still, any food that is sold, regardless of their origin, and is packaged in the absence of the consumer, must comply with technical regulations for food labeling in general, according to RDC Resolution N. 259-ANVISA/MS/2002. In the GMOs case, still applies in a complementary manner specific rules for labeling of genetically modified foods, which is the 4.680 Decree of 24.04.2003.

Since then, the last five years already attest, even a new

---

<sup>4</sup> Available for download at <http://www6.senado.gov.br/legislacao/ListaPublicacoes.action?id=250537> [Accessed 12 Jan 2010]

perception on the part of the European Union on the import of genetically modified soybeans for animal feed use: Brazilian exports of soybean meal, soybean included therein will be converted bran within the European Union, was 3.155 million tons in 2003, 3.788 million tons in 2004, 4.203 million tons in 2005, 6.089 tons in 2006, 9.021 tons in 2007, 9.697 million tons in 2008 and exceeded 10 000 tons in 2009. In parallel, the adoption rate of the transgenic soybeans' planting in Brazil has evolved, according to data from Agroceres (Brazilian company acquired by Monsanto in Brazil) as follows: 3% in 2003, 12% in 2004, 24% in 2005; 41% 2006, 57% in 2007 and reached 64% for 2008/2009. (<http://revistagloborural.globo.com/GloboRural/0,EEC1693159-1935,00.html>)

In fact, the specialized media releases statistics that show increased production of soybeans, driven by the low price of other commodities<sup>5</sup>.

Today, approximately 180 million acres are been planted with soybeans, a total that sums 64% of the total cropland in the country. There is, however, no accurate statistical data to informing the production of transgenic and conventional soybeans, compared, to see if indeed there was an increase in productivity due to the use of transgenic seeds. That also makes it impossible to verify whether the principle of efficiency, crucial for the TCT, isn't being respected in relation to costs of production as a whole.

## 6. FINAL REMARKS

To summer up this article which sought to present a new reading on the concepts and principles of bioethics,

---

<sup>5</sup> Available in Rafael Rosas – Valor Econômico - <http://www.valoronline.com.br/online/indicadores/10/302391/producao-de-soja-bate-recorde-e-puxa-safra-em-2010-diz-ibge> [Accessed 12 Mar 2010]

highlighting its importance and how they are affected by economic demands, since the soybean is a commodity whose production is concentrated in the five major companies' hands that control the technology innovation: Monsanto, Syngenta, Bayer, DuPont and Embrapa, whose genome sequencing of several species research as well as soybeans and maize, are largely financed by Monsanto itself. This fact, in the opinion of several researchers, can generate a large monopoly both of which can be produced much of what is sold / consumed in terms of seeds in our country, besides compromising the exemption needed to assess potential risks.

To support the research challenge, the author intends to demonstrate that the biosafety regulation in Brazil, especially in the genetically modified Roundup Ready soybeans case sectoral and hierarchical in nature – the model adopted for the production and marketing of genetically modified seeds – employs concepts and principles associated with the New Institutional Economics, and especially the theory of transaction costs. For this purpose, was presented the regulatory process of planting and sale of soybean species, based on the concept of complex society of risk. It was seen then that the model adopted follows the logic of the hierarchy of the firm, given that marketing decisions are submitted to the CTNBio deliberative and binding's opinions, but with overlap of transaction costs, since the contracts between the distributors seeds and the farmers came in time prior to normalization and that it recognized the planting done previously, even without the environmental impact assessments. This is explained mainly because there is no administrative litigation in Brazil and the regulators would not have autonomy of representation (legitimacy) to position themselves in court or out in the face of demands proposals or opinions on decisions emanating from them. That is, the notion of public service and the performance of its police power to control continues to be effected directly

by state agents (direct management), unlike what happens in France and the United States, for example.

Hence, the importance of having a clear and precise regulatory framework to establish responsibility for the distortion of the promises of the use of this novel technology, particularly relating to potential health and economic losses that farmers – confident in the release by the state – as consumers and environment will suffer.

Legislation remains in the difference between what is regulation for regulation and research to commercialization. It is believed that a debate is contaminated by another. The research activity is regulated, limited, made according to criteria of biosecurity, which generates knowledge, and possibly a product.

The regulatory system described in relation to industry, does not work, because few were so far the necessary permissions to perform the activity specifically, legally. With regard specifically to the domestic industry, and EMBRAPA, the research into GM is almost virtually paralyzed. What you see is a steady increase in imports of genetically modified seeds from Argentina and the United States, the multinational agribusiness. Besides an increase in export costs for farmers who do not use genetically modified soybeans, but the so-called “organic farming”, with the requirement of licenses for export of non-transgenic plants.

All research activity with GMOs developed in Brazil, until the publication of the current Biosafety Law (Law N. 11.105,2005), suffered from irregularity to be done under court order, which prohibited, including research on the field, until demonstrated safety environment of such cultivars. Considering the case of Roundup Ready soybean seed for planting and whose research was obtained mostly in an unauthorized manner, introduced by the border with Argentina, it became necessary, therefore, a minimum of legal regulation,

failing to provide the activity with boundaries and limits, compromising and hindering the formation and support of civil liability insurance for accidents of consumption and environmental damages.

This allows one to anticipate other possible conclusion of this work, considering the factor of failure of Government, both in the correct implementation of what was discussed and agreed in the Cartagena Protocol, in which Brazil is a part since 2002, and in the possibility of correcting the inconsistencies of sectoral regulatory legislation of GM at the same time. This allows CTNBio to act, exercising a kind of police power prior to release, but does not grant powers of fiscalization and sanction, that it would be logical follow-ups.

Finally, completing this paper reinforced the idea that the regulatory process of biosafety in Brazil, with the CTNBios creation although it confers regulatory powers imposing the other agencies involved is not similar as the one developed for other regulators, since to these was also given the power of preventive fiscalization and damage that exposes the consumer population, blaming the agents for causing the damage (the companies providing services and distribution of products) for his role negligent in relation to the precautionary principle. Provided further that, in some degree of police power, as envisaged in the new Biosafety Act when CTNBio says one can “authorize” and “waive environmental impact reports,” this commission is an advisory body to the Ministry of Science and technology, and therefore has no legal personality and administrative and managerial autonomy.

Therefore, it would not have the power to compel CTNBio market transactors to draft contracts that, in fact, insert specific safeguards in the event of environmental damage or personal for the spread of GM seeds and foods derived from them. The only possible way to safeguard is the guaranteed right of free choice and free market – avoiding the monopoly

and the right to inform consumers through labeling and the establishment and maintenance of the cooperatives of organic seeds that allow the continuation of non-GM soy seeds' planting, besides, of course, establishing clear rules regarding the promises made by biotech companies in terms of efficiency and quality of their products.



## 7. REFERENCES

- A. S. SAGE. 2003 GMOs, biosafety and the precautionary principle. In: *Revista do Tribunal Regional Federal da 1ª Região*. 2004. June: 16(6):21-22.
- C. RYDLEWSKI et al. 2010 The big bang of biomanufacturing. *Time business*; August: IV(42):140-61.
- D. NORTH. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- H. JONAS. 1998. *Le Prince responsabilité. Une Ethique pour la civilization technologique. Pour une Ethique du futur*. Paris: Rivage Porche.
- J. A. BEZERRA. 2000. Transgênicos - battlefield. *Revista Globo Rural*. 15(172): 50-4.
- J. R. COMMONS. 1997. The Problem of Correlating Law, Economics and Ethics. In: J. R. COMMONS. 1997. *Selected Essays*, V II. Florence: Routledge.
- M. BASLER, 1993. Mise en perspective de l'institutionnalisme of Quelques Économistes allemandes et américains. In: *Economie Appliquée*, XLVI: 4: 159-76
- M. BELL & K. PAVITA. 1992. Technology Accumulation and industrial growth. *Industrial and Corporate Change*.

Oxford: U: 2.2:157-210.

- M. G. D. FONSECA et al. 2004. Institutional and financial requirements for the emerging of biotechnology in Brazil, ISS. In.: *10th International Joseph A. Schumpeterian Society Conference, ISS*. 2004, Milan, June, University of Milan-Bocconi Cespry. (www.schumpeter2004.uni-bocconi.it. Paperdownload (\*.pdf) [Accessed 25 Nov 2010]
- O. WILLIAMSON. 2000. The new institutional economics: taking stock, looking ahead. *Journal of Economic Literature*; September. XXXVIII: 595-613.
- \_\_\_\_\_. 1996. *The Mechanisms of Governance*. New York: Oxford University Press.
- \_\_\_\_\_. 1985. *The economic Institutions of Capitalism*. New York: Free Press.
- P. BECHMANN & V. MANSUY. 2002. *Le Prince de precaution*. Paris: Litec.
- W. BELIK et al. 1993. Institutions, institutional environ. In: P. RAMOS. 2007. *Dimensions of agribusiness – policies, institutions and perspectives*. Brasilia: MDA: 103-40.
- R. COASE. 1998. *The firm, the market and the law*. Chicago: The University of Chicago Press.
- S. B. B. SOARES. 2007. *The civil responsibility for accidents consumption from production and marketing of GM seeds as a result of the regulatory process*. PhD Thesis. Gama Filho University; Rio de Janeiro, Brazil. February.