MONSANTO: HOW TO DRIVE GLOBAL AGRICULTURAL PRODUCTION?

In July 2013, Monsanto's Chairman for Europe, Jose Manuel Madero, announced the discontinuation of the genetically modified seed business in the region. Monsanto withdrew all of its pending requests to grow new transgenic seeds in Europe. In this way, the world largest producer of transgenic seeds would only maintain its conventional businesses of seeds and crop protection.

According to part of the media, the decision was logical, and it was caused by the long dated resistance of many EU countries to authorizing this type of crop. Monsanto's decision took place 18 months after another large corporation in the sector, the German BASF, made public that it was relinquishing research, development and commercialization of transgenic crops in the EU, due to the lack of support from European countries to Biotechnology. It was understood as an implicit acknowledgment that this reluctance was not expected to stop in the short or the mid-term. The European Union (EU) had not approved any genetically modified crop since 1998, and it was not expected to do so in the near future.

At the same time, environmental organizations like Greenpeace celebrated the company's decision as great news and an achievement toward its goal of eradicating transgenic crops worldwide.

However, Monsanto would not withdraw its request for authorization renewal for its MON810 maize, – the only transgenic trait[1] or character commercially grown in Europe – whose patent was due to expire in 2014. The characteristic feature of this trait was its resistance to certain pests that attacked maize plants, causing crop losses of up to 30%. Nevertheless, as one pundit stated, "*the differences between the varieties grown in Europe, which were the first ones to be marketed, and the more recent varieties of GMO seeds that Monsanto and other companies commercialize in the rest of the world, is like the difference there might be between the early and very limited cell phones, and the latest smartphones featuring state-of-the-art technology and performance*".

In July 2013, the EU had approved only two transgenic crops to be grown in its territory: Monsanto's MON810 maize and BASF's Amflora potato (although the latter was no longer commercialized due to lack of use among farmers). Nevertheless, the European Commission had already approved around fifty GMOs for animal and human nutritional use. Most of these products were imported from other countries, as it was not allowed to grown them in Europe. For this reason, Monsanto would continue to work on securing

[1] Genetic modifications of a crop are generally referred to as "traits" or "characters." Examples of these are: pest and disease resistance, drought tolerance, potential yield (kg/ha), color or size of fruit, content of certain nutrients, such as fats, sugars or starches, etc.

import permits for new transgenic products whose growth was authorized in other countries such as Brazil, Argentina, the United States, or India, in order to use them for animal or human nutrition in the EU.

Meanwhile, the world, and especially the agricultural sector, faced the challenge of duplicating food production worldwide to provide for the global population.

There was an open debate on this matter among farmers and also in society and among consumers. To what extent could this technology become a key tool to solve food supply problems in the world? How should Monsanto, as a leader in farming biotechnology, manage this situation?

GENETICALLY MODIFIED CROPS

Genetically modified crops had been on the market since 1996[2]. And their share of the global seed market has been growing since then. Globally, over 170 million hectares of transgenic crops had been cultivated in 2012 (**Exhibit 1**). Nearly 82% of soy, 81% of cotton, 35% of maize and 30% of rape grown worldwide were transgenic at that time. The adoption of transgenic soy, cotton and maize in the United States exceeded 90% of the cultivated space. It was estimated that, in 2012, GMOs had reached one-third of the global seed market value (from 23% in 2005). Other sources, like the company Vilmorin, asserted that GMOs had reached 49% of the global seed market in 2012.

In 2013, only one genetically modified trait or character was cultivated in the European Union (MON810, by Monsanto), which had been included in more than 100 commercial varieties in some 9 companies. It could be found, albeit in small quantities (combined, it hardly reached 1.3% of the maize cultivated area in the European Union), in Spain (with around 116,000 hectares in 2012), Portugal (9,280 Ha), Czech Republic (3,050 Ha), Romania (215 Ha) and Slovakia (190 Ha).

Detailed information about the history of agricultural biotechnology is presented in **Appendix 1**, as well as some definitions and systems to produce conventional and genetically modified varieties.

Public rejection: activists, governments and consumers

Despite the enthusiastic adoption of biotechnological products by farmers from many countries, a strong reaction surged against them from pressure groups as well as consumers and even governments. The European Union, in particular, was considered one of the most reluctant markets for transgenic products: many European consumers

[2] Genetic engineering has produced transgenic organisms since the 1980s for medical purposes (insulin manufacture, hepatitis B vaccine, human growth hormone, etc. Source: Transgenics that save lives http://www.soitu.es/soitu/2009/03/03/salud/1236098657242635.html accessed February 15th, 2016.

perceived biotechnological products as a threat to the environment and even to health. Some executives from the seed production industry attributed this reaction, partly to cultural prejudice against new technologies in general, and partly to food safety regulations stemming from the outbreak of the mad cow disease in the early '90s. Moreover, given that food supply was relatively abundant and affordable for European citizens, it was thought that the benefits of biotechnology were less relevant to them than to consumers in other areas of the world.

Genetically modified seeds were the first kind of crop to require an evaluation before being placed on the market, like pharmaceutical products. These are the arguments that pressure groups used to attack biotechnology and the companies that developed it:

- Environmental impact on surrounding crops, which might be "contaminated" with pollen from transgenic crops, potentially affecting biodiversity (indigenous varieties might become impossible to find if they are contaminated with transgenic crops). These groups also alerted of the potential impact on beneficial insects (like bees and others), which might be harmed if pest resistant crops were widespread.

- The idea that they are "not natural," but the result of genetic manipulation[3], which might imply a potential health risk. Several studies spreading this perception were usually circulated in social networks, media and forums. One of the studies that generated more controversy among the scientific community was Seralini's[4], which associated glyphosate resistant maize with mice cancer. Despite having been later withdrawn by the same scientific magazine that published it, because it was not conclusive and because it had "found gross errors in the research," it was still used by several anti-GMO forums as a reference.

- The perception that large multinational corporations put farmers in a position of strong dependency since they were forced to buy new seeds every year in order to take advantage of biotechnology advances instead of keeping them from one crop to the next. They were also accused of imposing their intellectual property rights with excessive zeal.

- The creation of a "de facto oligopoly", by potentially having global food production in the hands of just a few companies (Table 1).

[3]The Amflora potato, developed by BASF, was called in several forums opposing biotechnology the "Frankenstein potato", as a simile to the literary character, Frankenstein.

[4] Séralini, G. E. (2012): "Long-term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize", Food and Chemical Toxicology, Vol. 50, nº 11, November 2012.