



GM Soybean Seed Patent Expiry

- will encourage more farmers to use GM soy seed
- will reduce the total cost of soybean production
- will reduce GHG emissions as soybean will be preferred to corn and other feedstock for bioenergy production

INTRODUCTION

Genetically modified Roundup Ready (GM RR) soy was developed by Monsanto and was first commercialized in the United States in 1996. Due to the RR gene, a crop can be sprayed with glyphosate, which kills weeds and other plants but allows the crop to continue to grow. Farmers across the world find it difficult to buy and cultivate GM crops due to the high costs involved. Farmers must pay a licensing fee and sign a contract with the biotechnology company for limited permission to plant patented seeds for a single crop season. The percentage a farmer spends on seeds has almost doubled in the last 20 years. As a result of high productivity, however, more than 80% of soy harvest is currently from GM seeds.

Serious safety concerns about the transgenic modifications introduced into GM RR soy have been raised. Contrary to claims by the GM industry and its supporters, the US Food and Drug Administration has never approved GM soy seed as safe. A number of studies have revealed that health hazards and toxic effects are associated with GM RR soy. The debate between natural food and GM seed adoption is largely based on various economic and agricultural productivity benefits, as well as health and environmental costs.

GM Seeds: Current Situation

Due to the simplicity of the GM RR soy system, its adoption by farmers has increased. In the United States and Argentina, over 90% of soy crops were made up of the GM RR variety in 2009. Today, GM RR varieties dominate soy production in North America and Argentina and are widely cultivated in Brazil, Paraguay, Uruguay, and Bolivia. Globally, 77% of the soybean that is harvested comes from GM soy seeds. In the US, 91% of the soy harvested is from GM soy seeds.



Cost of Procurement

In the last three years, US seed prices increased by 64%. In addition, Monsanto's licensing royalty fees drove up the price of Roundup Ready soybean seed to \$15.65 per bag from only \$6.50 in 2000. DuPont Pioneer Hi-Bred announced a 35% increase in soy seed in 2009 and is projecting double-digit price hikes in 2009-2013. These drastic price hikes have slowly begun to frustrate growers and have led some producers to look for GM seed of lower quality at lower prices. A recently released 35-year study

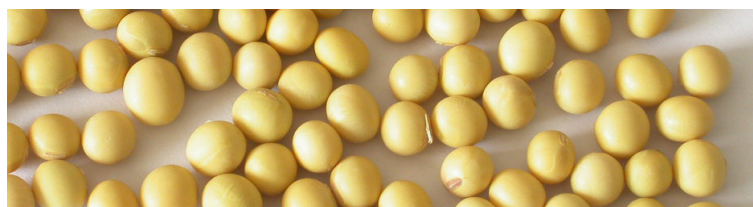
conducted by the Organic Center on seed pricing indicated that farmers spent 4-8% of their farm income on seeds up till 1997. Now, however, they spend an average of 16.4% of their income on genetically modified soybean.

Roundup Ready Patent Expiry

The patent for the Roundup Ready soybean seed is scheduled to expire in August 2011 in Canada. As a result, more farmers are expected to use GM soy seed instead of non GM seed for cultivation. Currently, more than 60% of soybean acreage in Canada uses the Roundup Ready system. In the United States, this same seed technology will remain under US patent protection until 2014.

Major Milestones

- The Roundup Ready soybean seed patent is set to expire in August 2011.
- Contract obligations prohibiting the saving of GM seeds under the Technology Stewardship Agreement will remain in effect in 2011.
- A farmer may decide to buy certified Roundup Ready seed from a company holding a valid license for Roundup Ready soybean without any contractual obligations or royalty payment to Monsanto in 2012.
- A farmer may decide to save seeds from its 2012 harvest for replanting in 2013, as long as the seed company from which it purchased the seed does not have any contractual obligations preventing it from doing so.
- A Canadian farmer may decide to plant soybean saved from his/her own seeds in 2013.



Estimated Production Cost Using GM Soybean Seed

Production costs vary depending on location, cropping systems, and fluctuations in energy prices. The major expenditures in soybean production include planting, harvesting, seed, and pesticides. On average, the total cost of irrigated soybean is around \$400 per acre. After the patent expires in the US and Canada, the production cost will decline significantly and allow more farmers to use GM soy seed.



Impact of Using GM Soy Seed

Socioeconomic Impact

Public health and socioeconomic concerns have been raised in various regions where GM soybean seed is used. According to experts, it has decreased domestic food security and food buying power among a significant sector of the population. In addition, this seed promotes inequality in wealth distribution.

Other Major Concerns

- Farming populations will be displaced and forced to relocate to the cities of Argentina.
- A few large-scale agribusiness operators will control the majority of agricultural production.
- The diversity of food production will reduce and fewer people will be able to access a varied and nutritious diet.

Environmental Impact (GHG Emissions)

In its Third Assessment Report (TAR), the Intergovernmental Panel on Climate Change concludes that human activities are the main contributors to global warming. Each nation is adopting measures to combat issues related to climate change. Global initiatives have been taken up by governments and companies to reduce the impact of their operations on the environment. As a result, the use of biofuels as a sustainable source of

fuel is increasing. The two major feedstocks used for the production of biofuels are corn and soybean oil.

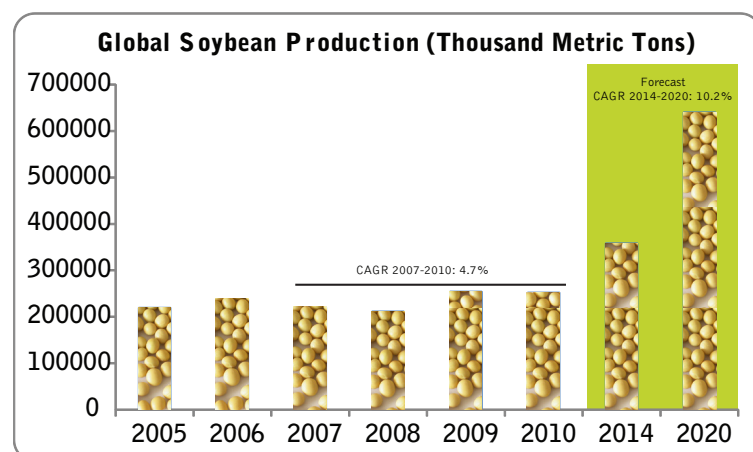
The greenhouse gas (GHG) emissions of corn-based ethanol range from 1.1- 2.0 kg of CO₂ equivalent per kilogram of ethanol, while GHG emissions of soybean oil are just 0.4-2.5 kg of CO₂ equivalent per kilogram of soybean oil. Hence, soy is expected to be the obvious choice among biofuel producers if the price of soy reduces in the future.



Soybean Market Outlook

The patent for GM RR soy seed is set to expire in 2011 in Canada and 2014 in the US. Consequently, a farmer's production cost is expected to fall by around 50%. The decline in costs will induce farmers to plant soybean instead of other crops, such as corn and sugarcane, which will increase the production of soybean.

Soybean prices are expected to drop by 50-100 cents/bushel due to the expiry of the soybean GM seed patent. The projected fall in the price of soybean is expected to drive the use of soybean oil as a major feedstock for the production of biofuels. A 2009 life cycle analysis of biodiesel done by the USDA found that soy biodiesel yields 4.56 times the fossil energy needed to produce it. In comparison, petroleum diesel has a fossil energy ration of only 0.84.



Source: Industry Experts, Soybean Associations, FAPRI, USDA and Supplier's Website

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