

## **Terminator Technology**

Includes:  
**Final Report**

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# TERMINATOR TECHNOLOGY

## Final Project Report

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The following essay will reflect on the issue of Terminator Technology, the political, social and ecological ramifications surrounding this technology, the complexity of the key stakeholders involved, an example of current practices, results, and the way forward with desired behaviors. This essay will focus around what is the background and current debate about the use of terminator technology, what are the implications for Canadian farmers and society, and where does the Canadian government stand on this issue?

This essay is in way of closure to the presentation and project link to TCCBE and the Seasoned Spoon along with student participation from class 334H, The Canadian Food System: A Community Development Approach. Finally this report will discuss a few challenges of the assignment and what I learnt from this experience in relation to course themes

In an educated and informed discussion about Terminator Technology we can not begin without an understanding about bio-diversity. Therefore the following quote is a firm basis of thoughtful consideration on the complexity of the issue:

It is imperative to take account the preservation and sustainable use of genetic species and ecosystems separate from human cultures. The knowledge of indigenous people and rural communities is an essential source of genetic diversity security and human health, and is the building block for environmental security, rural and urban development, sustainable agriculture, and the spiritual, social and innovative capacity of millions of farmers, forest dwellers, pastoralists and people who depend on natural resources. If we are to conserve genetic resources for future generations, then we must be concerned not only with conserving genetic resources but also with recognizing, rewarding and protecting the traditional knowledge we cannot conserve the world's biological diversity unless we also nurture the traditional knowledge of farmers and rural people who use and manage biodiversity as the basis for their livelihoods, we lose our last, best hope for

arranging and developing the living resources upon which we all depend. (The World Bank Group, 2005)

Clearly what is terminator technology? Terminator Technology is the colloquial name given to propose methods for restricting the use of genetically modified plants by causing second generation seeds to be sterile. (Wikipedia, 2006) The technology was under development by the U.S. Department of Agriculture and Delta and Pine Land Company in the 1990s and is not yet commercially available. Because some stakeholders expressed concerns that this technology might lead to dependence for poor small-holder farmers, Monsanto, an agricultural products company and the world's biggest seed supplier, pledged not to commercialize the technology even if and when it becomes commercially available.

The technology was discussed during the 8th Conference of the Parties to the UN's Convention on Biological Diversity in Curitiba, Brazil, March 20-31, 2006 Terminator Technology is one form of Genetic Use Restriction Technologies (GURT). There are conceptually two types of GURT. A V-GURT is a type of GURT, which produces sterile seeds meaning that a farmer that had purchased seeds containing v-GURT technology could not save the seed from this crop for future planting. A second type of GURT, a T-GURT modifies a crop in such a way that the genetic enhancement engineered into the crop does not function until the crop plant is treated with a chemical that is sold by the biotechnology company. (Wikipedia, 2006)

The benefits of terminator technology are as follows. Terminator technology will increase the safety of using genetically engineered crops. Since the seed carries the sterility trait,

say proponents; it is less likely that transgenic material will escape from one crop into related species and wild crop relatives. Biologically modified (BM) enhancement takes the form of selection for characters such as agro-ecological adaptation, resistance to biotic and abiotic stresses and improved culinary qualities, as well as knowledge addition through information on desirable traits. The most obvious benefit of the new technology is that it would enable the developers of new plant varieties to make a profit selling seeds in countries that currently lack intellectual-property protections for plants. Opportunities for such profits should encourage biotechnology firms to develop plant varieties suitable for cultivation in developing countries and then to make those varieties available to farmers

The potential disadvantage of "terminator" technology that looms largest in contemporary debate is the danger that farmers will become dependent on Western biotechnology companies for their supplies of seeds. With the patent announcement, the world's two most critical food crops - rice and wheat, staple crops for three-quarters of the world's poor - potentially enter the realm of private monopoly. Vandana Shiva best sums up this concern with her quote:

"A half-century after the Bengal famine [where, during British colonial rule, most of the food grown was exported for trade and for UK, instead of feeding hungry local people], a new and clever system has been put in place which is once again making the theft of the harvest a right and the keeping of harvest a crime. Hidden behind computer code is the search for innovative ways to hoard nature, and all the harvest of the seed, and the harvest of nutrition." (Vandana Shiva, 2000)

Of course the other greatest fear is that the sterility trait from first generation seed might spread via pollen to neighboring crops or wild relatives growing nearby. The danger is that neighboring crops could be rendered "sterile" due to cross-pollination - wreaking havoc on the surrounding ecosystem. Given that the technology is new and untested on a large scale, biosafety issues remain an important concern.

The benefits and disadvantages of terminator technology raise political issues. The manipulation of plant and animal genes has sparked highly publicized protests that have become regular WTO events. Non-governmental organizations (NGO's) immediately criticized weakened text for enshrining Organization for Economic Co-operation and Development (OECD) countries' priority to support private profit rather than food security, and for subordinating this environmental treaty to the trade rules of the WTO. NGO's raise the concern that half the world's farmers are poor and can't afford to buy seed every season, yet poor farmers grow 15-20 percent of the world's food and directly feed at least 1.4 billion people. (Mooney, 1998) These farmers depend upon saved seed and their own breeding skills in adapting other varieties for use on their often-marginal lands.

The current developments surrounding terminator technology are as follows. Monsanto publicly pledged in 2005 that the company will not "commercialize sterile-seed technologies in food crops" (Ban Terminator, 2006) This leaves the suggestion that Monsanto would use Terminator seeds in non-food crops (e.g. cotton). An international moratorium on Terminator was upheld at the UN meeting in March 2006. This did not

conclude Terminator technology would not be field-tested nor commercialized. Further to this end one can endorse the 'Ban Terminator Campaign' and join in national and international actions at <http://www.banterminator.org>.

Monsanto recently announced its takeover of Delta & Pine Land and Terminator Seed Technology. Delta & Pine Land is the US company that is testing Terminator seeds in greenhouses in the US, they own the first patent on Terminator jointly with the US Department of Agriculture, and have been actively lobbying for Terminator at the United Nations.

Here is another interesting developing front to watch from the Terminator producer perspective. It's inevitable that the US will have to drop its subsidy to large US cotton operations and when it does, the cotton seed business in the US will all but disappear with the market shifting to Africa and Asia. Companies are acting accordingly and stabilizing themselves to monopolize the clothing market.

The complexity of the commercialization issue is that many believe it is purely a business idea in forcing farmers to buy a fresh supply of seeds each year - many of whom are in the developing world and cannot afford to do this. Supporters of the terminator, or suicide, technology believe that the idea of it is for the protection of corporations from unscrupulous farmers. Control of seed germination helps prevent growers from pirating their technology. If crops remain fertile, there is a chance that farmers could use any saved transgenic seed from a previous season. This would result in poorer profits for companies.

So who are the stakeholders involved:

- **NGO's.** ie. Greenpeace, ETC Group, Niomi Klein, Vandana Shiva, Brewster Kaeen
- **Organizations.** ie. WTO, United Nations
- **Private Sector.** ie. Monsanto, Pioneer - A Dupont Company, Aventis(Bayer), Syngenta
- **Government.** ie. Canadian Gov't, United States Dept. of Agriculture (USDA)
- **Local Community.** ie. Farmers, Consumers

Stakeholder complexity issues include popular representation and dual objectives. For example one of the (many) points of contention regarding the international political arena on genetically engineered foods is regarding the World Trade Organization (WTO). The WTO argues that discrimination should not be made on how and where something is produced. In some ways, this makes sense. However, in other ways, while promoted as part of the notion of free trade, if a country imposes additional restrictions and safety concerns on products that are thought to be unsafe, or may have been produced in sweatshop-like conditions etc, they can all be overruled. Another complex relationship is the United States Department of Agriculture (USDA) who would not provide a copy of its contract with Delta and Pine (Monsanto owned), but under the public-private research program, USDA receives licensing fees and royalty payments when its inventions come to market—and USDA scientists personally get a cut of royalties as well

It's interesting to note that after the military budget, the agriculture budget is the second largest in the United States. (Now Magazine, 2004) And of the top 10 seed companies, pharmaceutical companies own many



**World's Top Ten Seed Companies (US millions)**

Monsanto (Pharmacia) \$2,803

Dupont \$2,600

Syngenta

Limagrain \$1044

KWS \$622

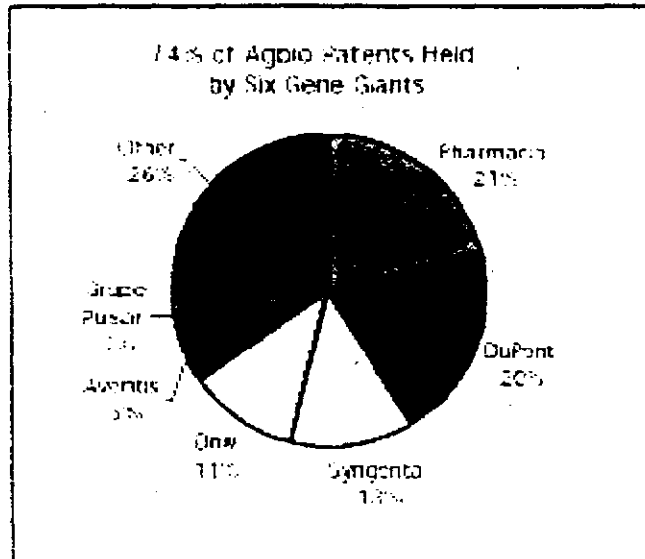
Land O'Lakes \$538

Sakata \$416

Bayer (Aventis) \$387

Takii \$366

DLF-Trifolium \$320



Greenpeace in response to Terminator Technology outlined the following:

There is an urgent need to implement the following steps and to spell them out in the Final Declaration of the Food Summit:

- To give priority to sustainable agricultural practices that respect traditional knowledge and the environment;
- To immediately ratify both the International Treaty on Plant Genetic Resources for Food and Agriculture and Cartagena Protocol on Biosafety;
- To recognise and implement the sovereign right of countries to prohibit any imports of GM's and to protect national genetic resources from genetic contamination, especially in centres of diversity;
- To stop patenting of life forms and to ban any genetic use restriction technologies, in particular Terminator technologies, as well as to maintain and increase public control of agricultural biodiversity;
- To eliminate environmentally destructive government subsidies in the agriculture sector.

The response of the Canadian government has not been as proactive as NGO's. In fact on Wednesday February 9, 2005 at a United Nations meeting in Bangkok, the Canadian government insisted that governments accept the field-testing and commercialization of Terminator varieties. The Canadian government attacked an official UN report, prepared

by an international expert group, which is critical of the potential impacts of Terminator seeds on small farmers and indigenous peoples. In stark contrast to Canada's public position, the report recommends that governments seek to end prohibitions on the technology. Many African and Asian governments have called for Terminator to be banned and the European Union has also been supportive of the existing moratorium. ETC Group Executive Director Pat Mooney speaking from Ottawa responded to the government's stance, "The Canadian government is doing the dirty work for the multinational gene giants and the US government. Even Monsanto wasn't prepared to be this upfront and nasty. Canada is betraying Farmers' Rights and food sovereignty everywhere." (ETC Group, 2005) ETC Group is dedicated to the conservation and sustainable advancement of cultural and ecological diversity and human rights. Look to read upcoming information generated December 7, 2006 regarding an on the floor discussion in the House of Commons about terminator technology.

Sustainable development is about ensuring a better quality of life for everyone now and for future generations to come. Corporate social responsibility, where companies are a part of society, have certain privilege, and they have been entrusted with resources, must see there is a responsibility to do something good, to make the community prosper.

Partnerships are a useful learning and informational tool for companies and their boards, enabling them to benefit from outside views and enabling stakeholders to improve their knowledge of and trust in the company. Consumers are generally for freedom of choice to effectively enhance quality of life while protecting the environment and promoting social equality. Consumers need information to make intelligent decisions.

Therefore when Vandana Shiva says partnerships are difficult if not mutually exclusive, where do we stand over this heated and debated topic of terminator technology?

**“There can be no partnership between the terminator logic which destroys nature’s renewability and regeneration and the commitment to continuity of life held by farmers of the Third World. The two worldviews do not merely clash -- they are mutually exclusive. There can be no partnership between a logic of death on which Monsanto bases its expanding empire and the logic of life on which women farmers in the Third World base their partnership with the earth to provide food security to their families and communities.” (Vandana Shiva, 1998)**

To further understand the issue of terminator technology it helps to look at some recent case examples:

#### Case #1

In India, there was cause for some concern as scientists feared for the livelihood of 400 million farmers and for food security in the country. Centuries-old ways of farming on which the poor depend are also threatened by new seed technologies. Already some poorer Indian farmers had been driven to suicide. It is feared that this type of technology could be used to make the poorer farmers even more dependent.

#### Case #2

Under patent laws in Canada, U.S. and a number of other industrialized nations, it is illegal for farmers to re-use patented seed without signing a licensing agreement. In a prominent case, a Canadian farmer was found guilty of growing patented seeds, even though he did not know it. The pollen from the patented canola seeds from a nearby farm had pollinated with his and thus he had to pay Monsanto for licensing and profit from the seeds. The corporate liability is reduced, while that of the individual farmer is increased. Hence are terminator sales to be achieved, as terminator technology is a way of protecting re-use of patented seeds?

After a discussion of biological diversity, benefits and disadvantages of terminator technology, current developments, complexity of stakeholder involvement, the response of the Canadian government, and the case studies what are the resulting outcomes for terminator technology? In a major victory for activists and protesters around the world, Monsanto, a major investor in this technology has decided not to market terminator

technology in the US. As genetic technology aiming to sterilize seed threatens to extinguish the right of farmers to save seed and breed new crop varieties, and threatens the food security of 1.4 billion people. (Mooney, 2006) Non-governmental organizations are calling for a global ban on the use of Terminator seeds. Both the patent and the technology should be rejected on the basis of common sense, food security and agricultural bio-diversity.

The way forward is deceptive but the following actions can help monitor terminator technology action:

- Demand branding on genetically modified foods (like in Europe and parts of Asia)
- Shop at health food stores and locations with a vested interest in non-engineered products.
- Support much needed public discussion and debate.
- Protect knowledge passed down over centuries to practice seed saving and selecting seeds best suited to the locality.
- Follow information sites such as <http://www.etcgroup.org/en/> or [www.banterminator.org](http://www.banterminator.org)
- Work for development of beliefs in business sustainability for future environmental, economical and social viability.

Finally we can ask ourselves what is the desired behavior. We want decisions made on sound science; we want to protect the environment as much as possible; and we want to protect consumer choice. Through important research, we want to clearly demonstrate that good corporate social and environmental performance is an investment that will improve the bottom line and the planet. In summation we want to support political, social and ecological avenues that put across the message that our concern exists surrounding terminator technology and further biologically modified foods.

In conclusion I learnt a lot from this assignment around the three main themes of our course; sustainability (environmental, economical, social), food security and community development. While terminator technology is more often a global issue than a community one it still involves all the players in order to address grave concerns over the sustainability of our food production and food security. After all we are a 'global community'. Food security and the sustainability of crops are directly related to the worlds 1.4 billion farmers living subsistently and these farmers are directly threatened by terminator technology and corpratization. I had challenges with gathering the information for this essay as many facts I collected were globally oriented, piece meal, or very scientific. So there was a lot of sorting through papers for informative details. Another challenge I faced was gathering the most recent information on a situation, which has changed rather rapidly over the last ten years. I think this is a highly charged political and business situation which could miss the social impact of such an irreconcilable controversy as terminator technology. Therefore I think a challenge exists in how to fairly present such a debate. Finally I think this topic coincides well with Food Security and On the Farm Sustainability Issues. I think the delivery of the presentation on Terminator Technology supported these course themes. I found the more familiar I became with my presentation material the more relaxed a presenter I was. I did find the venue at the Season Spoon to be a difficult place to hold a presentation. Unfortunately space in the Spoon is limited and so we held the presentation in the lounge which does not draw the same number of people. On the issue however, I have gained an in-depth appreciation for our farmers, and questions they face. Hence we as consumers also face the same issues and should remain pointedly aware and be actively supportive of these causes. In our

buying patterns we are already making decisions everyday, whether they are educated decisions is our choice.

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