

Can certification stop high soy pesticide use?

Soy cultivation is rapidly expanding to meet Europe's demand for biofuel. Certification initiatives are being set up in an attempt to ensure environmental standards including minimisation of pesticide use. Stella Semino questions their effectiveness when soy is grown in large-scale monoculture with high yields the top priority.

Over the past ten years European concerns about fossil fuel depletion, energy security and carbon emissions have stepped out of the wings and onto centre stage. And one part of a strategy to counter these problems is to increase Europe's use of plant-based ethanol and biodiesel (agrofuels).

In 2003, the European Commission (EC) in its Directive 'on the promotion of the use of biofuels or other renewable fuels for transport' adopted indicative targets of 2% by 2005 and 5.75% by 2010¹.

In 2005 the EC issued a Biomass Action Plan to increase the use of biomass for energy production. Its main objective is to double the use of bioenergy sources (wood, wastes, agricultural crops) in the EU's energy mix by 2010. The EC hypothesis is that 56% of agrofuel consumption will be biodiesel for transportation and that 70% of the biodiesel (or the raw material) will be imported. The strategy expresses concerns about the environmental impact of the current expansion of palm oil and soy in producer countries pointing to the need for a certification system².

At the end of 2007 the European Parliament and the Council of Ministers presented a proposal for a Renewable Energy Directive raising to 10% binding minimum target for biofuels in transport to be achieved by Member States by 2020³. This proposal also acknowledges the dangers of soy expansion and the need for a certification system.

Certification

In 2007 the EC's energy and transport directorate-general put out a public consultation on biofuels. It recommended a broad strategy for integrated management of land, water and natural resources that promotes conservation and sustainable use including water and soil qualities and considerations for livelihoods and rural development. It recommended a certification scheme with independent, third party verification system that would build on and complement existing initiatives to reduce the extra administrative burden of such a scheme.

The EC, and a number of private and public initiatives, are currently working on sustainability standards for biofuels. These are likely to be developed from existing certification initiatives like the Round Table on

Responsible Soy (RTRS), the Better Sugarcane Initiative (BSI), the Roundtable on Sustainable Palm Oil (RSPO), Forest Stewardship Council (FSC) certification, and the Roundtable on Sustainable Biofuels (RSB). The standards proposed are either voluntary⁴, or enforced by national laws which follow relevant international treaties⁵.

Argentina supplies new market

Argentina is well placed to respond to the expanding European market for biofuel. In 2006 the US television channel CNN (Cable News Network) reported that 'Argentina is a prime market for making and selling renewable biodiesel fuel thanks to cheap land and labour, as well as a bumper crop of soy beans'⁶. Argentina is the main GM soy bean oil producer in the world. And currently the main driver to increase soy crushing plant capacity in the Argentinean soy region is the demand from EU biofuels obligations. The planned expansion of crushing plant capacity will also make oil from soy beans from Paraguay, Southern Brazil and Bolivia, most of which is likely to be GM. By 2010 it is estimated that Argentina will make 10 times more GM soy bean biodiesel than it did in 2007⁷.



Fields are located right next to residential areas

Photo: Javiera Rulli

Round Table On Responsible Soy

The Round Table On Responsible Soy (RTRS) is an international, multi-stakeholder initiative started in 2004 by a group of producers, NGOs and companies concerned with the impacts of the soy economy. The current aim is to develop a certification scheme to address the social and environmental impacts of increased soy production. The RTRS supports an overall reduction in agrochemical use. However, at the same time soybean producers and traders in Argentina represented by AAPRESID (one of the stakeholders at the RTRS) and which count agrochemical companies in their membership are using more pesticides every year⁸.

Pesticide use

The 18 million hectares currently cultivated with GM soy, occupies more than 50% of Argentina's agricultural land⁹. And soy is the main crop responsible for the growth in agrochemical use in Argentina¹⁰.

The herbicide glyphosate has a 70% share of the trade, followed by insecticides

GM soya production and oil cultivation in Argentina

Year	Hectares planted	Crushed in Metric Tons
1995/96	5,980,000	9945
1996/97	6,200,000	10423
1997/98	6,954,000	16742
1998/99	8,165,000	17108
1999/00	8,583,000	16514
2000/01	10,401,000	19507
2001/02	11,400,000	22397
2002/03	12,600,000	24815
2003/04	14,000,000	25072
2004/05	14,400,000	29560
2005/06	15,200,000	32748
2006/07	16,300,000	35962
2007/08	16,371,000	35700
2008/09	18,000,000	37490

Source: United States Department of Agriculture Foreign Agricultural Service



The dust from the packaging process in a silo next to a family residence

Photo: Stella Semino

(17.2%), fungicides (6.4%) and seed treatment fungicides (4%)¹¹. According to agronomist Walter Pengue, researcher for the Ecology of Landscape and the Environment Group (GEPAMA) at the University of Buenos Aires, in the 1990s, annual sales of glyphosate in Argentina were one million litres compared to 180 million litres in 2007¹².

Pesticides are used at every stage of production starting well before seed germination and continuing well after harvest.

Land clearance

The area cultivated with soybean has been increasing since the 1990's. Some of this increased acreage has displaced other crops but the remainder has come from changes in land use. Forests and bushes have been cleared either mechanically, by fire or by aerial application of herbicides.

Agronomist Mario Monti from Santa Fe Province Production Ministry describes the clearance technique with herbicides:

- Two applications of Roundup (glyphosate) and Tordon (picloram) are made. The first defoliates while the second

controls weeds

- After clearance grass is sown
- The land is then subjected to a 'rational' management scheme in which smaller trees are felled and the highest trees are left
- The priority is the production of soybeans so if the place is suitable soya will be planted

In a 2003 open day at an experimental farm in the heart of the soya region, Monsanto representatives talked about how they helped to clear fields 'that were once considered marginal and now are part of the production chain'¹³. An advisor who worked for a farm in the north of the Santa Fe province reported a similar process of land clearance in his province.

Cropping

The GM soya is grown in large monocultures and, not surprisingly, glyphosate-tolerant weeds have started to appear, as well as new pests such as woodlice and slugs. Glyphosate is no longer sufficient to control the weeds and a wide spectrum of herbicides, insecticides and fungicides are now used for pest and weed control¹⁴. In 2007 fungicide application increased from 32% of the soya cultivated area to 50% of the soya cultivated area¹⁵. In September 2007 a glyphosate-resistant strain of the weed Johnson Grass started to spread: it was estimated that 25 million litres of herbicides other than glyphosate would be needed to control it every year^{16,17}.

The inadequacy of glyphosate was demonstrated in a 2007 field experiment, in Argentina. When the researchers applied a normal dose of glyphosate, 3 litres per hectare (1/ha), only 40% of the weeds were controlled. Even the highest dose used, 12 l/ha, did not provide complete control¹⁸. In a recent academic paper Steve Powles pointed out that to maintain glyphosate sustainabil-



Marta Cian from Entre Rios suffers from a chronic respiratory illness caused by dust from the soy silo near her backyard and has to use a mask when she goes out

Photo: Stella Semino

ity herbicide rotations, sequences, combinations of robust rates of different modes of action and use of non-herbicide weed control tools, are needed 'Through avoiding intense glyphosate reliance and by maintenance of diversity, the longevity of the precious herbicide resource glyphosate and excellent Glyphosate Resistant Crop technologies can be sustained for future harvests and future generations'¹⁹.

The non-herbicide weed control tools referred to by Powles are still in their early experimental phase so herbicide mixtures are currently applied to soybeans for weed control²⁰. These are sprayed aerially or from the ground, depending on the size of the area under cultivation. Glyphosate is commonly mixed with other herbicides and insecticides as metsulfuron, atrazine, paraquat, endosulfan. More recently fungicides have also been included in the mix. The pesticides applied in Argentina on Soybean include the World Health Organisation (WHO) class II pesticides endosulfan and paraquat (responsible for many poisonings in developing countries), and atrazine (a groundwater contaminant).

Storage

Pesticides are also required after harvest. Insecticides, including grain protectants, residual sprays and fumigants²¹ are applied to storehouses and to containers used to transport soybean to combat insect infestation. In 2007, the author visited several townships surrounded by soybean plantations, in the Entre Rios Province. During her two day visit, the sight and smell of polluted dust coming from storehouses was apparent. Activity at the grain silo created dust clouds which were blown towards village houses.

Health

In Argentina, the most frequent health impacts in villages and rural areas are chronic illnesses as a result of long or constant exposure to low quantities of agrochemicals. This type of intoxication is extremely difficult to diagnose. The state does not provide empirical data to measure pesticide impacts on the environment, or on human and ani-

Pesticides used on stored soybeans and soybean products

Commodity	Chemical name
Soybeans (Postharvest)	Aluminium phosphide (residues calculated as phosphide) Methyl bromide
Soybeans Aspirated grain fractions	Glyphosate isopropylamine salt Sulfonium, trimethyl-salt with N (phosphonomethyl) glycine (1:1)
Soybeans dry	Captan Linuron Malathion
Soybean meal	Acephate Fluazifop-butyl Metaloxyl Quizalofop-ethyl
Soybean oil	Azinphos-Methyl Fluazifop-butyl
Soybean flour	Inorganic bromides resulting from fumigation with methyl bromide, ethylene dibromide and/or 1,2-dibromo-3-chloropropane Quizalofop-ethyl
Soybean seed	Halosulfuron Sulfonitrazone Sulfonium, trimethyl-salt with N (phosphonomethyl) glycine (1:1)

Source: Code of Federal Regulations (1997)

mal health. The only information comes from reports of health practitioners and affected people, and from anecdotal evidence.

In the soy regions, there are numerous anecdotes about illnesses related to the spraying, the transport of soy by road within cities and from the storage dust²². The town of Monte Cristo (population 5286), Cordoba Province, illustrates the situation. The town lies on the border of a soy field and is indiscriminately sprayed with pesticides. Hazardous chemicals are also discharged into the atmosphere from grain dryers, from movement of fumigation machinery, and from grain silos all of which are in close proximity to the local people. During 2003 and 2004, 37 cancer cases were recorded in the town (four of leukaemia), 29 congenital malformations, six cases of asthma, five of Lupus. A high number of allergies were also recorded²³.

The World Bank and the United Nations Food and Agriculture Organisation reported in 2004 that Argentina had no record of pesticide related illness despite its importance. The Argentinian health system records acute poisonings but these can be caused by anything from rat poison for home use to agrochemicals used in the cities. The study reviewed three national registers and found that the lack of information was due to a lack of human resources and/or health professional training to develop records, and in some cases people are being pressurised to maintain silence. The national legislation on pesticides has not been reviewed since 1996. Health practitioners in Entre Rios in June 2007 confirmed the lack of concrete data to measure the effects of pesticides on the local human population (personal communication).

This article presents the paradox created by standards proposals aiming to reduce the use of agrochemicals on GM soy and the method of cultivating soy in large-scale monoculture which increases the need to use pesticides across the soy chain. It is difficult to see how pesticide reduction can be achieved by either voluntary or mandatory sustainability standards, given the need for industry to increase yields above all else.

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Aerial spraying of pyrethroids in Slovak National Park

The November 2004 windstorm which ripped through Slovakia left thousands of hectares of damaged forest in its wake. Spruce monocultures weakened by the storm provided an ideal habitat for the larch bark beetle which rapidly increased in number. Six months later Slovak foresters responded to the outbreak with localized applications of the pyrethroid cypermethrin.

Initially applications were made in small areas of commercial plantation forest: national parks, such as that of the Tatras, were protected by the Slovak State Nature Conservation Agency (SNCA). However, a new government elected in Slovakia in June 2006 replaced many of the personnel of the SNCA. In 2008 new state forests managers (state forests manage about 60% of Slovak forests) expanded their pesticide applications. Not only did they start aerial application of cypermethrin in state forests but they also started applications on more than 4500 hectares of the National Park of the Low Tatras which had previously been protected from such spraying operations. The aerial spraying was approved by the new Slovak Ministry of Environment, which issued an exemption despite the fact that aerial spraying is ineffective at controlling insects which live under bark such as the larch bark beetle.

Slovak NGOs supported by 150 experts called on the government to stop the applications and allow natural restoration to take its course in the protected areas. However, the government continued earmarking over 4 million euros for the spraying and to expand into other protected areas and national parks such as Muranska Planina.

Scientific and NGO experts organized under the national EKOFORUM network advocated natural restoration of affected areas without use of any chemical treatment in national parks as the best way to create a healthy forest able to withstand extreme weather in the future impacts. The population of larch bark beetle has already naturally significantly decreased in the year 2008.

Pyrethroids affect most sensitive and protected organisms, including insects and birds. Tourism and science has also been affected as entry to the treated areas of the national park was closed during most of summer 2008.

More information is available at: <http://www.ticha.sk/english.htm> and at: http://www.tichawilderness.com/flash_1.html

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