

Working papers



Transnational Corporate Interests and Environmental Governance: Negotiating Rules for Agricultural Biotechnology and Chemicals

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In the past two years two international environmental treaties were negotiated that have important implications for the agricultural input industry: the 2000 Cartagena Protocol on Biosafety (attached to the Convention on Biodiversity) and the 2001 Stockholm Convention on Persistent Organic Pollutants. The POPs treaty aims to phase out production and trade of a number of chemicals, many of which are agricultural pesticides. The Biosafety Protocol is an agreement to regulate the trade in genetically modified organisms (GMOs), including bio-engineered seeds and foods.

In the negotiation of these two treaties, industry players - including individual corporations as well as international and domestic industry associations - played an important role lobbying states in an attempt to ensure that the outcome of the treaties were 'workable' from their perspective. What is interesting about these two sets of negotiations is that agricultural industry players appear to have taken divergent positions with respect to environmental regulations. In the case of the POPs treaty, industry actors accepted without resistance the international community's resolve to implement strong measures that eliminate the production, use and trade of 8 agricultural pesticides that had once been extremely important to the agrochemical industry. In the case of the Biosafety Protocol, industry actors strongly resisted strict regulation over the trade of GMOs, including genetically modified seeds, and in the end advocated rules for the trade in GMOs that are weak and vague.

This apparent contradiction in industry's stance with respect to the degree of international environmental regulation is intriguing because the lines which once separated the agricultural chemical sector and agricultural biotechnology sector are becoming increasingly blurred through corporate concentration in an age of economic globalization. But rather than make the contradiction agricultural industry players displayed with respect to international environmental regulation more difficult to understand, I argue in this paper that the merger of the chemical and seed sides of the agricultural sector makes industry's positions on these treaties easier to understand.

Industry's motivations for its position in these two sets of treaties can be better understood only once we look more closely at the nature of the changes taking place in the agricultural chemical and seed industries in recent decades that have amalgamated these once separate sectors. These changes in the corporate structures in the agricultural chemical and seeds

industries are related to two important factors that have influenced the profitability of these sectors. The first relates to the status of patent protection for agricultural pesticides and bio-engineered seeds. The second relates to the evolving state of scientific understanding and regulation of the environmental implications of agricultural pesticides and plant biotechnology. The profitability of the agrochemical and seed sectors has been tightly tied to these factors, and changes occurring over the past 30 years have shifted profit margins and have been a key factor in driving not only increased corporate concentration, but also industry positions in international environmental treaty negotiations. In this era of change in the global agrochemical and seed industries, industry players in this sector have increasingly attempted to influence global economic and environmental policies in ways that help to ensure their own survival and profitability. Rather than being a paradox, the divergent positions on the POPs and Biosafety treaties displayed by industry actors is perfectly rational.

Corporate Players in Global Environmental Governance

The study of global environmental policy-making in the past 30 years has focused almost exclusively on the role of states in the formation of international environmental treaties. But in the current era of economic globalization, it is increasingly clear that non-state interests have an important role in both the emergence and prevention of global environmental problems and as key players in global environmental governance.¹ This is true not just in the environmental realm, but in international relations more broadly.² Recognizing the limitations of a state-centred approach to understanding global environmental politics, a growing number of scholars in the field have begun to point toward the relative lack of empirical studies on the role of non-state actors in global environmental negotiations and outcomes.

While the past decade has seen a burst in studies on NGOs in global environmental politics³, there has until recently been much less attention paid to the efforts of business lobby groups and industry representatives to influence the process. The field of international political economy has long included a focus on the structural power of transnational corporations and their resulting indirect influence in global politics.⁴ There is also an emerging literature on their role as sources of ‘private authority’ in the global political realm.⁵ But relatively little has been written on the motivation and impact of transnational corporate players in global environmental

governance. This is surprising given that these players have a strong presence in global environmental negotiations, and have enormous significance for the outcome of international environmental treaties. Inside observers often note that without the ‘blessing’ of industry players, international environmental negotiations are more likely to be protracted and difficult, and the resulting treaties are less likely to succeed.

Because of the significance of these players, a small but growing academic interest in the role of transnational corporate interests as global environmental players has emerged.⁶ This surge in interest in industry groups as key players in global environmental policy-making can partly be explained by the growing visibility of these actors in global environmental negotiations since the 1992 Earth Summit.⁷ The presence of industry lobby groups at the negotiation of global environmental treaties is now routine, and their involvement in the global politics of environmental issues in general is on the rise. Transnational corporate actors are no longer content to react to international environmental agreement outcomes, but rather are increasingly engaging directly in public debates over global environmental issues. This is particularly true with respect to global environmental issues with clear economic implications for industry, such as the politics surrounding the waste trade, climate change, ozone depletion, chemicals, biodiversity, and deforestation, to name some of the more recent examples.

Analyses of the role of transnational corporate interests in these specific cases have only just begun to be undertaken. Some studies have looked at differences in corporate positions in one region compared to another, or differences among specific companies in the same issue area, such as in the case of climate change. These studies seek to explain divergent corporate positions by pointing out differences in social-cultural and political-institutional settings in which these firms operate, especially in cases where firms have similar economic profiles.⁸ This line of inquiry has been important in beginning to unpack the motivations for the lobby positions taken by industry players in international environmental treaty negotiations.

At the same time, though, while not denying the influence that social-cultural and political-institutional factors can have on firm behaviour, Levy and Newell point out that with economic globalization, differences seen in industry positions on key global environmental issues are increasingly dominated by economic considerations. As companies merge, the positions taken by industry players on key environmental issues, such as climate change and ozone depletion, are becoming more unified, despite their geographic location.⁹ Studies along

these lines have looked at the ways in which the structural power of these actors in the broader global political economy influences environmental treaty outcomes.¹⁰

Both of these approaches are important. The first, however, does not easily apply in the case of biosafety and POPs negotiations, as the positions taken by industry players in these two cases did not divide along regional or country lines. And because the two sectors under question have increasingly merged in recent years, it is also difficult to argue that differences in corporate culture in those sectors account for the divergence of positions with respect to the two issue areas. The second approach, which focuses more on economic considerations of firms to explain their positions, is more applicable to this case study. In taking this approach, I argue that the dominance of the economic considerations in an industry's stance on global environmental issues can also help us to understand the divergent positions of an increasingly concentrated industry, such as the agrochemical and seed industry, in *different* issue areas in which it has a stake. Identifying the factors that influence the profitability of firms is key to understanding firms' economic considerations, and thus their positions on international environmental treaties.

The status of patents on products being regulated, as well as state of scientific understanding and regulation with respect to the safety and environmental implications of those products are strong factors that affect the profitability of the agricultural chemical and seed industry. The profitability of these aspects of their business in turn affects both the corporate merger activity in these sectors as well as the position they take on environmental negotiations that seek to regulate them. Patent status and the level of scientific understanding of environmental risks associated with certain products have also had some significance in understanding industry's position in other environmental treaty negotiations. For example, in the case of the Montreal Protocol, it was the development of alternative, patent-protected chemicals, combined with firm scientific proof of the existence of a hole in the Ozone that led DuPont to push for an elimination of CFCs.¹¹ Also, the fossil fuel industry has tried to exploit scientific uncertainty over global warming as a reason to resist strong rules for curbing climate change, largely because it fears economic losses from rules which curtail the use those fuels.¹²

Though these explanations have relevance in other cases, there has been little academic research that focuses explicitly on them as factors that influence industry's strategy in environmental treaty negotiations. In comparing the biosafety and POPs negotiations, it becomes

clear that these factors help to explain the economic predicament and in turn the position of industry lobby groups and firms in these sectors.

In taking this approach to examining the positions of industry players in environmental negotiations, it also becomes clear that studying the negotiation of an environmental treaty in isolation does not give the complete picture. As I have argued elsewhere with respect to the hazardous waste trade and the migration of dirty industries, related issues areas need to be examined together, so that linkages between them can be determined which in turn help to explain industry behaviour in trying to influence environmental governance mechanisms.¹³ In the case of biosafety and POPs, the decline in one industry has directly spurred investment and research in the other, and this linkage helps to explain why industry has been cooperative in one case and less so in the other.

Corporate Influence in the POPs Treaty and the Biosafety Protocol

Transnational firms and industry lobby groups have had a strong presence in the negotiation of both the POPs treaty and the Biosafety Protocol. A comparative study of their role in these treaties is particularly important because of the changes in the agricultural chemical and seed industries that have brought these two sectors increasingly together in recent years. Today, many of the same firms are involved in both agricultural biotechnology and chemical pesticide production. For example, three of the top global seed firms, DuPont, Monsanto and Syngenta, are also among the top four global agrochemical firms. DuPont and Syngenta are especially worth noting. Both are top producers of genetically modified seeds, and both have acquired several of the companies that produced the original POPs pesticides that are now being phased out globally. So it is companies like these that should have a particularly strong stake in both the POPs negotiations and the Biosafety negotiations. Below I outline the issues at stake in both sets of negotiations and the positions taken by industry players in each.

Cartagena Protocol on Biosafety

When the Convention on Biodiversity (CBD) was agreed in 1992, it was recognized that there was a need for a protocol to govern issues of biosafety. There were growing concerns over transboundary movement of living modified organisms, and the potential impact on biodiversity

that might arise from their release into the environment.¹⁴ Reflecting this concern, the text of the CBD asks parties to consider the negotiation of a protocol on biosafety.

The parties to the CBD have taken this task seriously, and talks on a biosafety protocol began in 1995 and continued through to January 2000, when an agreement was finally hammered out. The main regulatory mechanism included in the protocol is Advanced Informed Agreement (AIA), a version of the prior notification and consent procedure seen in other international treaties, such as those for the trade in hazardous wastes and chemical pesticides.¹⁵ The AIA applies to the import and export of ‘living modified organisms’ (LMOs), otherwise known as genetically engineered, or genetically modified, organisms.

Negotiations on the biosafety protocol were contentious throughout. Though the planned completion date was the end of 1998, the talks came to a head in February 1999 and were suspended due to an inability of the negotiators to agree on some key issues. The issues that were holding up the negotiations included: which GMO products were to be covered by the protocol; the use of the precautionary principle versus risk assessment based on ‘sound science’ as rationale for countries refusing imports of GMOs; and the relationship of the protocol to international trade rules under the World Trade Organization (WTO).¹⁶

Different groups of countries were deeply divided on these issues, with the so-called ‘Miami Group’ (US, Canada, Australia, Chile, Argentina and Uruguay) taking a position that would promote freer trade in LMOs. The Miami Group argued in particular that only genetically modified seeds for intentional release into the environment should be regulated, and not GMO commodities like food, feed and processing. It also argued that WTO rules should prevail in the case of conflicts, and that the precautionary principle should not be incorporated into the treaty. Rather, they argued that risk assessment based on ‘sound science’ should be the basis of parties’ decisions on whether to accept imports of LMOs.

Other groups of countries had very different views on these matters. The ‘Like-Minded Group’, including most developing countries, wanted the regulation of LMOs to cover all genetically modified organisms, including commodities, and wanted the right to refuse imports of LMOs based on the precautionary principle. The European Union, along similar lines to the Like Minded Group, argued for use of the precautionary principle, and wanted to ensure that the Protocol would not be over-ridden by the WTO in the case of conflicts.

Industry groups and environmental NGOs were observers at these negotiations, and attempted to lobby these groups to take on their views. Industry groups had a particularly strong presence at the negotiation sessions. Their interest in participating in the negotiations grew over the course of the talks, with 8 industry groups represented at the first round of negotiations in Aarhus, Denmark in 1996, and 20 such groups present at the 1999 meeting in Cartagena.¹⁷ Individual corporations with a strong interest sent their own representatives to many of the meetings, such as Monsanto, DuPont and Syngenta (formerly Novartis and Zeneca). Industry lobby groups with wide memberships which were present at the negotiations included Biotech Industry Organization (BIO) (a US based biotechnology lobby group), BioteCanada, Japan BioIndustry Organization, the International Chamber of Commerce, and International Association of Plant Breeders for the Protection of Plant Varieties.

In the negotiations, the various industry groups participating took similar positions and they did not divide along regional lines.¹⁸ They were strongly opposed to the adoption of strict rules to limit the production and trade in genetically engineered seeds and crops.¹⁹ In particular, they argued that only living modified organisms that were intended for release into the environment should be covered by the treaty, and that commodities containing GMOs, mainly food and animal feed, should not be covered. They argued that to cover all commodities containing GMOs would slow trade unnecessarily.²⁰ Because commodities were their largest market, it was clear that this was an effort to stop regulations that might hurt their sales and profits. A representative of the North American Export Grain Association noted in 1999 that it was impossible to segregate GMO commodities, and that labels indicating that they ‘may contain modified crops’ ... “is about as stringent... as we can live with.”²¹

Industry groups also argued that reference to the precautionary principle should be limited in the treaty, if not left out entirely. Instead, industry groups strongly argued for the use of risk assessment based on the weight of science as a requirement before countries made decisions on whether to refuse imports of LMOs. Finally, industry lobbied hard that WTO rules should not be overshadowed by the biosafety protocol rules. They wanted to ensure that in cases of conflict, the WTO rules would prevail.²² In taking these positions on the various issues, industry groups tended to favour positions taken by the Miami Group.²³

Talks on completion of the protocol text resumed with informal consultations taking place over the summer and fall of 1999 and an Extraordinary Conference of the Parties was

scheduled for January 2000 in Montreal. By January 2000, the negotiation atmosphere had changed considerably from what it was a year earlier. There are several reasons for this. First, safety issues around GMOs become a politically charged issue among the general public not only in Europe but also in Japan and in North America, making completion of an agreement extremely important for both governments and industry in order to gain the public's trust.²⁴ Second, the Montreal meeting took place shortly after the failed WTO meetings in Seattle, at which thousands of protestors were present, many of which expressed concern over trade in GMOs. At Seattle, some parties, such as the US, pushed for the creation of a Biotechnology working group to sort out trade issues related to GMOs, as an alternative to the Biosafety Protocol. But this effort failed, along with the rest of the WTO meeting. Given these developments, it was suddenly apparent to the negotiating parties that the biosafety protocol was going to be the main instrument for regulating trade in GMOs. The US in particular saw that if trade in GMOs was to continue at all, it would need to be legitimized by some sort of biosafety agreement, and thus it was eager to see the agreement completed.²⁵

At the January 2000 meeting in Montreal, industry groups had formed an entity known as the Global Industry Coalition, chaired by Canada's BioteCanada.²⁶ The purpose of this group was to give industry one powerful voice to let the parties know its position. It claims to represent more than 2,200 companies based in over 130 countries.²⁷ By forming one industry coalition, the regional division that occurred among the negotiating states did not replicate itself among business actors.

The final agreement represented a compromise among the parties, and has been characterized as being vague and somewhat ambiguous.²⁸ With respect to the question of which GMOs are to be covered by the treaty, in principle it covers all LMOs, but it divides them into categories with different sets of rules applying to each, and some exemptions also apply. LMOs intended for release into the environment (seeds) in the importing country, are subject to a formal AIA procedure for the first international transboundary movement to a country.²⁹ Importing countries can reject these if they wish, based on risk assessment. Genetically modified commodities (for food, feed or processing) are exempted from the formal AIA procedure, and instead are subject to a separate form of notification, in the form of a Biosafety Clearing House, an internet-based database where exporters are required to note whether shipments of such commodities 'may contain GMOs'.³⁰ Importers can also reject such shipments, based on risk

assessment. In both cases, parties are given the right to make decisions on imports on the basis of precaution in cases where full scientific certainty is lacking.

The treaty uses the words ‘precautionary approach’ in the preamble and in the objective, but in the first instance it is mentioned (in the preamble) it specifies that this approach specifically refers to Principle 15 of the Rio Declaration. This compromise is important, as Principle 15’s version of precaution implies that at least some scientific assessment must be conducted, and that precautionary measures in cases where full scientific certainty is lacking should be ‘cost effective’.³¹ But the word ‘precaution’ is not mentioned in the main text. Instead it refers to parties’ right to take decisions regarding import of LMOs even in situations where scientific certainty is lacking.³² This approach to the precautionary principle closely mirrors industry’s desires to have it tied explicitly to Principle 15 of the Rio Declaration. This linkage was in fact proposed as early as 1997 by the International Chamber of Commerce as a way to incorporate this concept into international environmental treaties.³³

This wording with respect to precaution is accompanied by references to the relationship of the treaty to other international agreements. The WTO rules call for countries to prove scientifically that a product is unsafe before it can block imports. The preamble of the Biosafety Protocol states that trade and environmental agreements should be mutually supportive, and that the “Protocol shall not be interpreted as implying a change in the rights and obligations of a Party under any existing international agreements.” But it then goes on to state that the Protocol should not be subordinate to other international agreements.³⁴ This vague set of statements can be interpreted in many ways, and it appears that their contradictory nature was in fact key to obtaining agreement on the text, particularly on the part of the Miami Group.³⁵

The vague way in which these conflicts were resolved in the treaty is reflected in the fact that the various groups all claimed victory when the text was finalized. Industry groups applauded the agreement.³⁶ In particular, they were pleased with the wording with respect to other trade agreements, which in their view obligates parties to apply a scientific risk assessment to back up decisions regarding whether to block an import of a product. Val Giddings of the Biotechnology Industry Organization stated: “Our rights and obligations under WTO are completely intact.”³⁷ He further stated that “The Miami group got virtually everything it wanted.”³⁸ Business actors were also pleased with the outcome because they saw that it had several other benefits for them. First, it was seen to have called for a consistent global framework

for regulating trade in GMOs, which for them gives them a sense of predictability and stability.³⁹ Second, the existence of an accord on this trade serves to ‘legitimize’ the trade in GMOs, which industry sees as important for gaining public trust in GMOs more broadly.⁴⁰

Stockholm Convention on Persistent Organic Pollutants

Most of the chemicals classified as POPs are pesticides and industrial chemicals that have been widely produced and traded as commodities since the end of the Second World War. They are synthetic chemicals that have only been around since the advent of industrial chemistry, with their use peaking in the 1960s and 1970s. The twelve POPs that the treaty initially considered for control were the pesticides aldrin, dieldrin, DDT, endrin, chlordane, mirex, toxaphene, heptachlor, the industrial chemicals hexachlorobenzene and PCB, and the industrial by-products dioxins, and furans.⁴¹

POPs chemicals pose serious environmental and health risks. These chemicals are persistent in the environment and they have a tendency to bioaccumulate. This means that they are stored in living organisms in fatty tissues, and they can be passed on from one generation to the next as well as through the food chain. POPs are also of concern because they are prone to long-range transport via air and water in a process referred to as the ‘grasshopper effect’ to remote areas of the globe where they were never used or produced. The Arctic region, for example, is especially contaminated with POPs. Recent research has only begun to reveal the health risks of exposure to these chemicals, which are now believed to cause cancers and hormone disruption resulting in birth and reproductive defects in both humans and animals.⁴²

In the face of rising concern about these chemicals in the mid-1990s, the Governing council of the United Nations Environment Programme (UNEP GC) adopted a decision in 1995 to gather information and develop a strategy for reducing and/or eliminating their production and release into the environment. This included consideration of international action on a legally binding treaty to regulate these chemicals. This was parallel to efforts of the United national Economic Commission for Europe (UNECE) which was also developing a protocol on such chemicals, which was completed in 1998. Following a series of international meetings on POPs, it the UNEP GC decided in early 1997 that there was sufficient information on these chemicals to warrant immediate global action. It recommended that work should proceed on the development of a legally binding instrument on POPs, with an initial focus on the 12 POPs

mentioned above. Negotiations on this treaty began at the first meeting of the International Negotiation Committee (INC) on POPs, held in Montreal in June 1998.

The POPs treaty negotiations were relatively smooth and swift compared to the biosafety talks. The talks began in mid 1998 and the convention was opened for signature in May 2001, with most of the text ready by December 2000. The treaty calls for measures for the immediate elimination, for production and use and international trade, of the chemicals listed in Annex A to the treaty, namely 7 of the agricultural pesticides (minus DDT) and the two industrial chemicals hexachlorobenzene and PCBs, when the latter two are intentionally produced POPs. A major exception to the elimination of the POPs pesticides is the exemption granted for certain countries to use DDT for malaria control. It also calls for the measures to reduce or eliminate releases of the unintentional by-product POPs, including unintentional releases of PCBs, hexachlorobenzene, dioxins and furans. The treaty further requires parties to aim to prevent the production of new chemicals that exhibit POPs characteristics.⁴³

The negotiations were relatively uncontroversial, at least regarding the elimination for production, use and trade, of most of the POPs pesticides. Though developing countries, as the main users and producers of these pesticides were not happy with the fact that they will face increased costs to replace them with alternative chemicals, they did not hold up the treaty on this point. The main issues of contention in the negotiations were the use of DDT for disease control, the practicality of requiring elimination of unintentional POPs by products, and the use of the precautionary principle when it comes to adding more chemicals to the list of banned substances. Though it is widely accepted that DDT is a dangerous chemical, a number of developing countries and health groups argued that it was one of the only chemicals capable of providing protection from malaria, and thus should be exempted from the elimination requirements.⁴⁴

On the other issues, the European Union and the United States were on opposite sides. The EU argued for a strong legal commitment to total elimination of POPs chemicals, and promoted the use of the precautionary principle to guide the addition of new chemicals to the list of chemicals to be eliminated under the treaty. The US argued that a total elimination of all POPs, in particular the unintended by-product POPs, was impractical, instead pushing for management of these chemicals rather than their elimination. The US also pushed hard to avoid any mention of the precautionary principle in the text, preferring instead to require risk assessment based on 'sound science'.⁴⁵

In the end these issues were resolved in a way that all parties could live with.⁴⁶ The 8 POPs pesticides were slated for elimination of production, use and trade. The exemption for DDT was incorporated into the treaty for countries that notify the treaty secretariat that they use it only for disease control, and users must be registered with the secretariat. Regarding unintentionally released POPs, including some releases of PCBs and hexachlorobenzene, as well as dioxins and furans, the treaty specifies that parties are to reduce the total emissions of these chemicals, and ultimate elimination where 'feasible'. The language regarding the precautionary principle represents a compromise between the two sides and closely mirrors its use in the Biosafety Protocol. The treaty uses the words 'precautionary approach' in four places, but in the first instance it is mentioned (in the preamble) it specifies that this approach specifically refers to Principle 15 of the Rio Declaration.⁴⁷ This version of precautionary approach is much more palatable to the US than the EU version, which many analysts say does not imply use of scientific based risk assessment as part of the approach.

Early on in the talks, and throughout the negotiations, industry players were quite supportive of a treaty to phase out POPs chemicals, particularly the pesticide POPs.⁴⁸ Those groups present at the negotiation sessions included American Chemistry Council (ACC, formerly Chemical Manufacturers Association), The European Chemical Industry Council (CEFIC), Global Crop Protection Federation, International Council of Chemical Associations (ICCA), and the World Chlorine Council. These groups became much more involved in international treaty negotiations in the mid-1990s, especially through the presence of groups such as the ACC and the ICCA.⁴⁹ Unlike the biosafety talks where individual companies sent representatives to the negotiations, business representatives at the POPs treaty talks were all from industry lobby groups and business associations, indicating that individual companies did not have enough at state to send their own representatives to these meetings.

As in the case of Biosafety, these groups took positions that were very similar to the US position. The elimination of the use and production of intentional POPs was not the biggest issue for industry groups. The biggest issue was adding new chemicals, and by-products, to the list of POPs to be controlled by the treaty. Industry wanted each POP candidate to be individually scrutinized by a panel of experts to consider appropriate control measures, and it wanted any measures to be based on both technical and socio-economic considerations.⁵⁰ Its aim was to avoid an automatic conclusion to eliminate such chemicals. Industry was also initially was

against inclusion of the word ‘precaution’ in the treaty, especially with respect to adding new chemicals to the list. It much preferred to see a reference to scientific based risk assessment, and strongly advocated the linkage of Principle 15 of the Rio Declaration if the word ‘precaution’ was to be used at all.⁵¹ Though in the end the word precaution was included in the treaty, the compromise language under which it was mentioned was acceptable to industry groups, especially because of its implied use of scientific based risk assessment.⁵²

Industry was also keen that unintentional by-product POPs should be managed with a goal toward reducing their releases, rather than being committed to their total elimination, which some groups, such as the Chlorine Chemistry Council, argued was impossible.⁵³ While the proposed exemption for DDT was a heated issue among developing countries and environmental and health groups, the chemical industry did not chime in on this discussion. The final treaty was widely supported by industry groups.⁵⁴ ACC president Fred Webber noted at the signing that it has long supported the POPs treaty process and stated: “Most importantly, the treaty recognized science as the basis to restrict or eliminate production of these chemicals and for future decisions on others.”⁵⁵

Shifting Profit Margins in Pesticides versus Agricultural Biotechnology

Though they took very similar positions on the use of the precautionary principle in both treaties, industry players took very different positions with respect to whether the particular product being regulated was ‘legitimate’. What can explain industry’s relative support for delegitimizing certain agricultural pesticides and phasing them out of production, use and trade, while it is keen to support and legitimize the trade in products based on agricultural biotechnology? While industry took strong positions with respect to the two treaties, it did not explicitly state in its position papers or to the media exactly *why* it took those positions.

I argue here that economic considerations, in particular the profitability of the industries being regulated, were extremely important in shaping industry’s positions on the two treaties to a great deal. In particular, the recent changes in the profitability pesticides versus that of agricultural biotechnology, helps to explain the corporate mergers of these two sectors and also sheds light on industry’s positions in international environmental treaties. The source of these changes in profitability for these sub-sectors of the agricultural input industry is closely tied to

the status of patent protection and the state of scientific understanding with respect to the safety of these agricultural inputs. I explain each of these more fully below.

Status of Patent Protection

Whether patents are new, about to expire, or already expired appears to have played a large role in firms' positions regarding global regulations of chemical pesticides and bio-engineered seeds. The status of patent protection obviously has a strong influence over the profitability of a particular product, and this affects industry's stake in protecting its market.

The patents on the 8 listed POPs pesticides expired years ago in most industrialized countries, as shown in Table 1. Most were brought to market in the 1940s and 50s, and have been off-patent since the 1960s and 1970s.⁵⁶ Moreover, many of the POP chemicals are no longer approved for use in industrialized countries. This is because many of them were banned for domestic use in industrialized countries following concern in the 1970s and 1980s over their environmental and health impacts.

Table 1: The Eight Agricultural Pesticides Slated for Reduction and/or Elimination by the POPs Treaty

Pesticide	Date Introduced as a Pesticide (Approximate)	Original US Patent Held By	Most Uses Banned in US Since
DDT	1941	Montrose Chemical Co./Ceiba Geigy	1970
Aldrin	1950	Shell	1974
Dieldrin	1950	Shell	1972
Endrin	1950	Shell/Velsicol Chemical Co.	1979
Chlordane	1945	Velsicol Chemical Co.	1978
Heptachlor	1952	Velsicol Chemical Co.	1978
Mirex	1946	Allied Chemical Co.	1978
Toxaphene	1946	Hercules Powder Co.	1984

Sources: Pesticides Action Network Pesticides Database; Anne Platt McGinn 2000; Janice Jensen (USEPA Office of Pesticides); Greenpeace; UNEP Chemicals Webpage (http://db.chem.unep.ch:8887/irptc/owa/lgpop.get_search). Some exemptions existed for some of these chemicals into the mid-1980s, mainly for termite control.

Though many Western countries have banned the use of these chemicals domestically, some are still produced in industrialized countries and exported to developing countries where they are still widely used. Velsicol, for example, continued to produce chlordane in the US for

export to developing countries into the 1990s.⁵⁷ Because most of the pesticide POPs no longer enjoy patent protection in industrialized countries, they are inexpensive relative to new and patent-protected alternatives, and as a result their production and use in developing countries has been on the rise in recent years.⁵⁸ The phase-out of production of these chemicals will thus create a market for newer alternative chemicals that still enjoy patent protection.

Generic, or off-patent, pesticides account for 53 percent of global pesticide sales, and this figure is expected to rise to 69% by 2005.⁵⁹ Generic brands are generally 25% cheaper than brand names.⁶⁰ None of the big agrochemical companies produce the eight POPs pesticides in industrialized countries. Instead, they are produced mainly by smaller chemical companies that specialize in producing off-patent pesticides. These companies are either based in the industrialized world and produce these chemicals for export to developing countries, or are they are based in developing countries themselves. DDT, for example, is now only produced in a handful of countries the developing world, with China and India believed to be the main producers. About 30 countries still use DDT, most of them in Africa.⁶¹ Because the large agrochemical companies are not making large profits off of the 8 POPs pesticides slated for elimination under the Stockholm Convention, they are probably keen to eliminate generic competition by wiping out production of these chemicals.

While industry may be keen to see these particular POPs pesticides eliminated from the global market, they are very wary of the addition of further chemicals to the treaty list. While there are numerous chemical pesticides that exhibit POPs characteristics, some of these are still on patent, and industry does not want to lose its market for them. It is most likely for this reason that industry players have laid out very clearly the criteria it prefers for the addition of new chemicals to the POPs treaty list.

With respect to agricultural biotechnology, the story is somewhat different. Patents for genetically engineered seed have been granted only recently, most of these in the past five to ten years. These patents will thus provide another 10-15 years of protection for bio-engineered seeds.⁶² The idea of patenting life forms such as seeds is in itself quite novel. It is only since the 1980s that such patents were even allowed in the US and other industrialized countries, and in many developing countries the issue is very controversial. The TRIPS agreement of the WTO aims to harmonize laws for providing intellectual property protection, including patenting of plants and other life forms, across countries. This move has spurred more investment in the

agricultural biotechnology sector by private industry players, as intellectual property protection allows them to recover research and development costs. Also, the relative speed with which genetically engineered plants can be brought to market (around 6 years, compared to conventional plant breeding, around 10 years) also makes the long time frame for patent protection attractive.⁶³

The result has been a rush to register patents on crops in the past decade, as shown in Table 2. According to one study, 1370 patents for agricultural biotechnology had been granted by the US Patent and Trademark Office to the top 30 patent assignees by the end of 1998.⁶⁴ These patents are extremely concentrated in the hands of just a few large agricultural biotechnology companies. Seventy-four percent of the patents for agricultural biotechnology products registered in the US at the end of 1998 were held by just six corporations. Because of this patent protection, and its concentration in just a few companies, industry's stake in bio-engineered seeds is much larger than it is in the 8 POPs pesticides.

Table 2: Concentration in AgBiotech Patent Holdings

Corporation	Number of AgBiotech Patents Held in the US (as of end 1998)
Pharmacia (Monsanto)	287
DuPont (Pioneer Hybrid)	279
Syngenta (Novartis and Zeneca)	173
Dow (Mycogen)	157
Aventis	77
Grupo Pulsar	38

Source: ETC Group, Communique, Issue 71, "Globalization, Inc.", July/August 2001, p.7

The global agricultural chemical industry had annual sales in 2000 of US\$30 billion versus annual sales in the global seed trade of US\$24.4 billion.⁶⁵ Though total revenue from seed sales is less than that for agricultural chemicals, the growth in sales of genetically engineered seeds in particular is driving investment in that sector. Growth in the sale of genetically engineered seed was 145% in 1998.⁶⁶ The global value of the genetically modified seed industry in 1999 was in the order of US\$2.5 billion, or about one tenth of the total global seed market. But many predict that this market will grow to around US\$25 billion by the year 2010.⁶⁷ At the same time the chemical pesticide industry in the US grew only 0.2 percent in 1998, and fell 0.6% in

2000.⁶⁸ The concentration in these industries is striking, and they overlap considerably, as shown in Table 3. But both chemicals and seeds sectors have become more concentrated, with the top 10 agrochemical companies controlling 84 percent of the global chemical market, and the top 10 seed companies controlling 30% of the global seed trade and 100% of the market for bioengineered seed.⁶⁹

Table 3: Chemical and Seed Sales of the Top Agro-Chemical and Seed Companies

Corporation	Agrochemical Revenues in US \$million	Seed Revenues in US \$million
Syngenta	\$6,100	\$958
Pharmacia	\$4,100	\$1,600
Aventis	\$3,400	\$267
BASF	\$3,400	N/A
DuPont	\$2,500	\$1,938
Bayer	\$2,100	N/A
Dow	\$2,100	\$350

Source: ETC Group, Communique, Issue 71, “Globalization, Inc.”, July/August 2001, p.8

It is clear that the declining patent protection in agricultural chemicals combined with the new patent protection of genetically engineered seeds directly affects the profitability of these sectors and has been a driving force in the corporate and sector mergers over the past few decades. Indeed, a large part of the rationale for these firms to develop genetically engineered plants was that the patents on some of the key agricultural pesticides currently in use were coming up for expiration. If agricultural seed industries could genetically engineer seeds that were resistant to their own brand of pesticides, and require farmers that purchased those seeds to agree to use them only with their brand of chemicals, then the markets for those chemicals could continue to be secured, even after their patents expired.

This is precisely the strategy that companies such as Monsanto pursued in the mid-late 1990s. The patent for Monsanto’s largest selling herbicide, Roundup (based on the chemical glyphosate) expired in Canada and most other countries in the late 1990s and in the US in the year 2000.⁷⁰ It is not surprising, then, that Monsanto’s Roundup Ready Corn and Canola were among the first bioengineered seeds that were brought to the market by that company in the mid-1990s. It was vital for Monsanto to secure its own sales of that chemical before its patent ran out in the US.⁷¹ The strategy seems to be working so far. Monsanto’s Roundup became the most

widely used herbicide on soybeans in North America in 1998, nearly doubling from the previous year, primarily because of increased planting of Monsanto's Roundup Ready soybeans.⁷² Even though profitability in the chemical sector has been waning, total revenues from chemicals sales still outweigh seeds sales. This goes a long way toward explaining why herbicide tolerance has continued to be the main trait for which crops have been engineered since they first came to market. In 2001, 77 percent of newly-marketed GM seeds were engineered for herbicide resistance.⁷³

The GM seed industry also has the capacity to ensure that its patents are protected, even in markets where patent laws are not as strictly enforced as in industrialized countries. It has developed genetically engineered 'terminator' seeds that produce only sterile second generation seeds. The use of this technology would prevent farmers from saving seed from their GM crops for future use, forcing them to buy new seeds every year. Various versions of the terminator technology were patented by Monsanto and Syngenta in the U.S. in the 1990s, but they vowed in 1999 to not commercialize it because of public opposition to it. However, a number of agricultural biotech companies have continued research into developing this technology in recent years, and two new patents on it, held by DuPont and Syngenta were granted in the US in 2001.⁷⁴

Weight of Scientific Evidence Regarding Risks

The status of patent protection helps to explain a large part of the shifting profitability of the agricultural chemical and seed sectors in recent decades, driving not only more corporate concentration but also determining positions taken by the industry in international environmental negotiations. But it does not give the entire picture. Profitability of these sectors has also been influenced by the availability and general acceptance of scientific studies on the environmental and health impacts of chemical pesticides genetically engineered crops. The level of general agreement on the risks associated with these technologies directly affects the degree of regulation for approval and use placed on the products in question at the domestic level, and this in turn determines costs for research and development for new products, affecting their profitability. The degree of scientific 'certainty' over risks posed by chemical pesticides and agricultural biotechnology is not static – it is ever changing as we learn more through study of these technologies. Since the study of agricultural chemical pesticides has been around longer

than that for agricultural biotechnology, we naturally understand much more about the risks these chemicals pose than we do about the risks posed by genetically altered plants.

It is widely accepted in scientific studies that certain agricultural pesticides which are POPs pose serious environmental and health risks.⁷⁵ There have been numerous scientific studies on these pesticides, conducted not only by industry researchers but also academic and government scientists. Though there may be some controversies over the degree of risk and hazard of certain POP chemicals in lower exposures, it is widely acknowledged that they are persistent in the environment, that they bio-accumulate in living organisms, and that they cause a number of health problems, especially in high doses.⁷⁶ The significant weight of the scientific evidence was a large factor in the push to eliminate the production and use of these chemicals through the POPs treaty. US President Bush has pledged to ratify the Stockholm Convention swiftly, citing the strong body of scientific evidence to support the strict control of these chemicals, as well as industry's support for it.⁷⁷

The increased understanding of the risks posed by these chemicals over the past 50 years has much to do with the fact that the POPs pesticides listed for elimination in the Stockholm Convention have been banned for use in most industrialized countries for years, as noted above. But scientific understanding of these chemicals has not always been uncontroversial. There was initially enormous resistance to the idea that these chemicals were potentially harmful when they were first introduced, and throughout the 1960s. Industry scientists lost no time attacking Rachel Carson for her claims about the harmful impacts of DDT in her path-breaking book, Silent Spring. Carson and her supporters were accused of overstating the case against DDT and other chemicals such as endrin, heptachlor and chlordane.⁷⁸ But years of study have shown that the threats posed by these chemicals are indeed real.

Environmental and health concerns associated with chemical pesticides have contributed to the rising cost for developing and bringing new pesticides to the market. Product development costs in the agricultural chemical industry have increased by a factor of four since 1975.⁷⁹ The regulatory approval process for a new pesticide is now long and protracted, with environmental regulatory agencies in most industrialized countries examining them extremely closely before approving a new chemical for release. According to one estimate based on interviews in the pesticide industry, the average cost to develop a new pesticide is estimated to be around US\$130 million.⁸⁰ This approval process and the associated costs are much higher now than they were

when the industry was just getting off the ground in the 1950s. At that time there were fewer regulatory hurdles and the competition was much less fierce. As a result it was much easier then for chemical companies to recoup their research and development costs and still turn a profit. As described by one analyst, this period was the ‘golden era’ for the chemical pesticides industry.⁸¹

But development and marketing of new pesticides has slowed considerably since the 1950s because of the more stringent regulatory process.⁸² It now takes on average 8-10 years to bring a new agricultural chemical through the regulatory process, eating into a significant portion of a new pesticide’s patent life.⁸³ Moreover, today competition from generic pesticides sales drives down prices for brand names made by leading companies, leaving less profit to invest into research and development of new products. As a result profitability for chemical pesticides began to decline in the 1980s. At the same time, spending on research and development grew. Worldwide pesticide research and development expenditures expanded 3.2 percent per year between 1983 and 1993 (from US\$ 1.96bn to US\$ 2.68 bn) while at the same time the global pesticide market saw only 1.5 percent per year growth (from US\$ 21.74 bn to US\$ 25.28 bn).⁸⁴ In the US, the proportion of research and development costs that were devoted to getting a product past regulatory hurdles increased from 17.5 percent in 1972 to 47 percent in 1989.⁸⁵

The response to these developments has been a rash of mergers and acquisitions in the agrochemical industry. Only a few large companies can afford to put money into research and development of new chemical pesticides, explaining the disappearance of many of the less profitable outfits starting in the 1980s. Today the companies that first developed 8 POPs pesticides listed in the Stockholm Convention have either ceased producing pesticides, or have been swallowed up by large agrochemical companies, as shown in Table 4. These large agricultural input firms did not even bother to send delegates to observe negotiations over the elimination of these chemicals, because mainly they are not producing them anymore, or if they make them for export they are not all that profitable.

In contrast to the wealth of scientific knowledge about the risks of chemical pesticides, scientific inquiry into the health and environmental impacts of genetically engineered seeds and plants is relatively new. Compared to the number of independent scientific studies on the environmental and health effects of POPs, there are very few independent scientific studies on the environmental and health impacts of agricultural biotechnology. As governments have cut back agricultural research spending in the 1980s and 1990s, there funding for such studies is hard

to fine. Moreover, there is great controversy over the reliability of the studies that do exist. Industry has sponsored most of the research conducted on genetically modified plants so far, leading many to question its validity. At the same time, the few studies carried out by independent researchers are viewed with great skepticism by industry.

Table 4: Fate of Chemical Companies that First Produced the 8 POPs Pesticides listed for Control in the Stockholm Convention on Persistent Organic Pollutants

Chemical Company	Fate
Velsicol (chlordane, heptachlor)	Purchased by Sandoz, which merged with Ciba-Geigy to form Novartis, which merged with Zeneca and is now known as Syngenta.
Shell USA (aldrin, dieldrin, endrin)	Acquired by DuPont, which also purchased Pioneer Hybrid Seeds.
Shell International (aldrin, dieldrin, endrin)	Sold its agrochemical business to American Cyanamid in 1993, which is now BASF.
Allied Chemical Corporation (mirex)	Merged with Signell to become AlliedSignell, and then merged with Honeywell. Has divested its agricultural chemical division.
Montrose Chemical Corporation (DDT)	Became defunct in 1982.
Hercules Powder Company (toxaphene)	Now Hercules, Inc. No longer produces pesticides. Currently up for sale.

Sources: Hartnell 1996, Webpages for Honeywell, USEPA, Hercules, Inc., and ETC Group.

This lack of a strong body of scientific literature on the environmental and health impacts of genetically engineered seeds and crops has benefited the agricultural biotechnology sector in terms of costs to bring a product to market. The regulatory approval process for genetically modified plants in North America, for example, has been relatively swift when compared to that for new chemical pesticides. The first genetically engineered crops were approved for use (with an initial 5 year trial) in the US in the mid-1990s without much delay. Though the USEPA

acknowledged that its initial approval of Bt crops was not based on extensive study of the risks, it has recently re-approved registration of 5 Bt corn varieties this past fall following a two year approval process, for an additional seven years (though with more stringent requirements than the original approval).⁸⁶ In Canada it takes about 12-18 months for genetically engineered seeds to go through the regulatory approval process.⁸⁷ The regulatory process in Europe is more protracted than it is in North America, likely reflecting the stronger affiliation to the precautionary principle in Europe in the face of scientific uncertainty.⁸⁸ Though the delays in Europe have been longer than in North America, the EU has not yet rejected any GM seeds or foods as unsafe.⁸⁹

This easier time with registration of new GM crops, at least in North America, affects the cost of bringing these products to the market, making biotechnology a more attractive option for these large agrochemical-seed companies than developing new pesticides. Whereas the cost of bringing a new pesticide onto the market is high, as mentioned above, around US\$130 million in the mid-1990s, it typically cost US \$ 10 million to bring a new GM plant variety to market.⁹⁰ Biotech companies would undoubtedly like to keep these costs down, and have lobbied the US regulatory agencies to this effect, saying that more regulation in approving these crops will only create disincentives to develop new products.⁹¹ Industry continues to argue that these technologies are perfectly safe, lamenting (incorrectly, when we consider regulations on agricultural chemicals) that biotech products are more heavily regulated than any other technology in history.⁹² This cost difference between developing a new pesticide and a new genetically engineered plant variety also helps explain why the newly conglomerated agrochemical-seed industry is focusing its efforts on developing new plant varieties using biotechnology that match the plant to existing chemicals, as discussed above.

This scientific uncertainty surrounding GM crops and the lighter regulatory burden associated with it is likely a key factor in the agricultural input industry's reluctance to curtail the production and trade of these products in forums such as the Biosafety Protocol. Moreover, industry is using uncertainty over the impact of genetically modified agricultural products as an opportunity to assert that the products are safe. When the US re-approved Bt corn this past fall, Val Giddings of BIO stated:

The EPA's approval of continued use for these products sends a strong signal to the rest of the world that these products are safe and offer significant benefits for growers, consumers and the environment.⁹³

Despite heightened consumer awareness of and concern over potential environmental and health risks associated with GE crops, their use has not declined globally. The area planted with GM crops increased more than thirty-fold between 1996 and 2001, from 1.7 million hectares to 52.6 hectares.⁹⁴ Four countries accounted for 99% of this GM crop area: the US, Argentina, Canada and China. GM crop areas are expected to grow in 2002. But the potential future risk of waning profitability looms over the industry. Growing protests over these crops, particularly in Europe but also now increasingly in the US and Canada, has put more pressure on government regulatory bodies to scrutinize new products more closely before deciding on whether to approve them. This may ultimately affect the profitability of the agricultural biotechnology. But for now it is still in its own 'golden era', with long patent lives ahead of it, and a relatively smooth approval process.

Conclusion

Economic considerations appear to be the dominant factor explaining the positions taken by industry players in the Cartagena Protocol on Biosafety and the Stockholm Convention on Persistent Organic Pollutants. Though on initial inspection the positions taken by industry groups and corporations in these sets of negotiations appears to be somewhat contradictory with respect to the degree of global environmental regulation they were willing to accept, on closer examination the positions taken make perfect sense in light of the economic considerations faced in the industry.

The line that once separated the global agrochemical and agricultural seed industries has become increasingly blurred over the past decade, as a wave of corporate mergers and acquisitions has not only brought these sectors increasingly together, but also has led to a high degree of corporate concentration in these sectors. The merger of these two sectors is itself related to economic performance of the agrochemical and agricultural biotechnology sectors. While the chemical industry has seen its growth stagnate over the past two decades, the growth in the agricultural biotechnology industry has been much stronger.

The factors that most strongly account for these shifts in economic performance of these sectors are the status of patent protection and the degree of scientific understanding with respect to the risks associated with chemicals and agricultural biotechnology. These factors explain not only why the two sectors were pushed together in recent decades, but also the position that industry players in these sectors took with respect to global environmental treaties. Expired patents for older pesticides and a strong body of evidence that points to their negative environmental and health effects (and contributes to higher costs to bring new pesticides to the market) explains industry's eagerness to remove certain products from the agricultural input market via the Stockholm Convention. These rules in effect open up the market for alternative chemicals produced in industrialized countries that are still on patent. Existing patent protection on bio-engineered crops and the large degree of scientific uncertainty surrounding their environmental and health impacts (leading to less expensive costs to bring new products through the regulatory process) explains industry's interest in pushing for weaker international controls in the Cartagena Protocol on Biosafety. What appears to be a contradiction in the industry's positions on the two treaties, then, is perfectly logical from their economic standpoint when examined more closely. Both rules embodied in both treaties in effect legitimize and create market opportunities for the high profit products that they are trying to sell.

The comparison of industry positions in these two treaties also reveals that looking only at single issue areas when studying the role of industry in global environmental governance misses important linkages across different issue areas. Economic globalization has led to increased corporate concentration not just within sectors, but has also led to sector mergers. This points to a growing need to examine closely related issue areas together in order to gain a better understanding of industry attempts to influence the development of global environmental regulations that affect their business. Similarly (and something I was unable to do in this paper for space reasons) it is important to also simultaneously look at industry's attempts to influence not just environmental regulations, but global economic regulations that touch on these issues through bodies such as the WTO. Industry's role in pushing for an internationally harmonized standard for intellectual property rights through the TRIPS agreement in the early 1990s, for example, was an important step in securing property rights for plants and other living modified organisms that was crucial in helping to understand the chemical industry's appetite for acquiring biotechnology in the mid-1990s as a cure for its expired patents and waning profits.

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⁸⁶ USEPA Press Release, “Biotechnology Corn Approved for Continued Use”, October 16, 2001, online at the USEPA Website: www.usepa.gov. Karen Werner, “EPA Conditionally Reapproves Biotech Corn for Seven Years; Additional Data Requested”, BioTech Watch, Oct.17, 2001.

⁸⁷ G. Bruce Doern, “Inside the Canadian Biotechnology Regulatory System: A Closer Exploratory Look”, Canadian Biotechnology Advisory Committee, November 2000, p.10.

⁸⁸ Les Levidow and Susan Carr, “Unsound Science? Transatlantic Regulatory Disputes over GM Crops”, International Journal of Biotechnology, vol.1, Nos.1/2/3, 2000. p.258.

⁸⁹ Ibid.

⁹⁰ Michael Ollinger and Leslie Pope estimate that the cost to bring genetically modified plants to market is around US\$ 10 million, of which US\$1 million is for regulatory costs. Michael Ollinger and Leslie Pope, “Strategic Research Interests, Organizational Behavior, and the Emerging Market for the Products of Plant Biotechnology”, Technological Forecasting and Social Change, Vol.50, 1995, p.56. It took Calgene 10 years and expenditures of around US\$ 20 million to bring its Flavr Savr tomato through the regulatory process and onto the market. (Beth Baker, “Streamlining of Biotech Regulations Pleases Industry”, Bioscience, Vol.44, No.8, 1994, p.527). Monsanto in 1995 spent around US\$ 30 million on developing genetically engineered plants (Peter Fairley and David Rotman, “Plant Biotech”, Chemical Week, Vol.157, No.11, 1995, p.25).

⁹¹ Karen Werner, “Industry Says More Regulatory Scrutiny of Biotech Crops Could Spur Chemical Use”, BioTech Watch, October 2, 2001; Karen Werner, “Industry Supports EPA Biotech Exemption, Citing Safe Crop History, Regulatory Burden”, BioTech Watch, October 11, 2001.

⁹² Susan Bruninga, “Industry Applauds Biosafety Protocol That Allows for More Information Sharing”, International Environment Reporter, Vol.23, No.4, Feb.16, 2000, p.145.

⁹³ Quoted in David Safford, “Industry Groups Praise Bt Corn Decision, Environmental, Consumer Groups Opposed”, BioTech Watch, October 17, 2001.

⁹⁴ International Service for the Acquisition of Agri-biotech Applications, “Global GM Crop Area Continues to Grow and Exceeds 50 Million Hectares for the First Time in 2001”, Press Release, January 10, 2002. Online at http://www.isaaa.org/press%20release/Global%20area_jan2002.htm.