PESTICIDE REGULATION IN THE EU AND CALIFORNIA

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In 1962, Rachel Carson wrote *Silent Spring* about the hazards of the pesticide DDT and thereby helped to launch the modern environmental movement in the U.S (Gunter 2005). Since then, the use of pesticides has remained an important and contested environmental issue, though its early prominence has perhaps waned as the public has become conscious of scores of other environmental issues—endangered species, climate change, air pollution, wilderness, etc. Nevertheless, pesticides remain an important and multi-faceted regulatory issue. Pesticides are first and foremost a food safety issue and debates about “residual” levels of pesticides in our food remain an important topic of debate. But pesticide contamination is also air and water-borne and thus closely connected to debates about air and water pollution. Pesticides also represent a serious occupational hazard for agricultural workers.

Pesticides are at the heart of a societal debate about the status of intensive, industrial farming and they are also connected in various ways to debates about the introduction of bioengineered crops (Monsanto’s Bt corn was engineered to be resistant to its weedkiller Roundup, while other crops have been designed to reduce the use of pesticides). Pesticide regulation is also related to larger agricultural trade issues. As pressures to reduce protections on European and American agriculture mount, indirect protectionist measures—such as food safety standards—are sure to become more prominent. Recent concern about the quality of imported Chinese products suggests the potential magnitude of this debate. Finally, pesticides are indirectly connected to another broad issue—a rethinking of how we regulate chemicals. Although the scope of Europe’s ambitious REACH program has ultimately been restricted, it signaled the
beginning of a serious discussion about how we regulate chemicals. Greater attention to pesticide regulation is likely to be a by-product of this discussion.

Pesticide regulation is also interesting from the perspective of regulatory cooperation between Europe and California. While there is a long history of pesticide regulation in EU member states, an active regulatory regime for pesticide residues has been developing at the European Level. The earliest Council Directives on pesticide residues extend back to 1976, but extensive regulatory activity really began in the early 1990s. Beginning in 1999, the Commission has developed annual recommendations for the development of a coordinated Community monitoring program for pesticide residues at the national level and in 2005, the European Parliament and the Council issued a new regulation that consolidated a series of earlier amendments on maximum pesticide residues. In 1992, the European Commission also began a very extensive review of plant protection products, which is supposed to be completed in 2008. As in other European regulatory programs, the EU has gradually ratcheted up its level of involvement in pesticide regulation.

California is not only the largest user of pesticides in the U.S., but also has stricter regulatory standards than those of the U.S. Environmental Protection Agency. California has also been a leader in developing pesticide monitoring programs. California’s Department of Pesticide Regulation (DPR) claims to not only have the strictest regulations in the U.S., but also to have “the largest and best-trained enforcement organization in the nation” (DPR website).
This paper will examine pesticide regulation in the EU and California (and secondarily, in the U.S.) to evaluate whether regulatory cooperation between them is likely or possible.

**Pesticide Regulation in the European Union**

*Overview of EU Regulation*

The regulation of pesticides remains an important issue in the European Union and its member-states:

- The European Environment Agency’s Fourth Environmental Assessment (2007) argues that “[m]ajor environment-related health concerns in the pan-European region continue to be linked to poor air and water quality, hazardous chemicals, and noise.”

- In 2005, the European coordinating monitoring program found that 4.7% of samples tested exceeded national or EU maximum residue limits (European Commission 2007a). In food examined for residuals, fungicides were mostly found on fruits and vegetables and insecticides on cereals. Violation of residue limits was more common in imported food (6.4%) than in non-imported food (2.4%).

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1 These percentages refer to “surveillance” samples: samples taken when authorities have a concern or suspicion about a product. Pesticides like DiMethoate and Endosulfan, Maneb group, were found in the most cases to be above the maximum residue levels. The fruits and vegetables with the highest exceedances were beans (8.4%), spinach (6.6%) and oranges (4.3%). Fruits and vegetables where residues were most often found were mandarins, oranges, and pears. DiMethoate is used on beans and oranges and Endosulfan and Maneb group on spinach.
Europeans are concerned about pesticide contamination of their food. Forty-two per cent of Europeans surveyed in a special Eurobarometer survey in 2005 believed that eating food could harm their health; 14% reported that pesticides, chemicals, or toxic substances are what came to mind (“spontaneous responses”) when they thought of harm coming from food (food poisoning was the most frequently noted concern, at 16%). When prompted about a range of risks related to foods, however, pesticides proved to be the risk that Europeans were most worried about (European Commission 2006a). Twenty-eight per cent of EU citizens are “very worried” and 42% are “fairly worried” about pesticides in their fruit, vegetables, and cereals (e.g., grains). With the exception of the Netherlands, a majority of citizens in all EU countries reported being worried about pesticides in food.

On the other hand, Europeans also have an economic interest in the production and use of pesticides. As the European Commission notes: “The European plant protection industry is a significant economic player on the world market: In 2002 it employed around 26000 people in the EU-15. Three of the five largest global companies are based in Europe” (European Commission 2007, 9) and Europe produces a quarter of the world’s supply of pesticides (Beyond Pesticides Blog, October 29, 2007). The European agricultural industry has begun to push back against more extensive European pesticide regulation, arguing that it could have significant negative effects on the productivity of European agriculture.²

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In the last two decades, a distinctive European pesticide regulatory regime has emerged. As in many cases of European regulatory authority, this regime began as an attempt to harmonize regulatory standards in order to facilitate European market integration. In 1976, the Council issued its first directive setting maximum residue limits in fruits and vegetables, which was followed by further directives in 1986 and 1990 that extended the harmonization of residue standards. These laws were consolidated in EU regulation in 2005 (Regulation (EC) N 396/2005). With the implementation of this regulation, member states can no longer set more stringent regulations than those set by the EU. The centerpiece of the EU regulatory regime, however, is EU Directive 91/414, which sets the legal basis for authorization of pesticides in the EU. This Directive initiated a review of the safety of active ingredients in pesticides and required authorization of the ingredients before these ingredients could be marketed or used in the EU. In 1992, therefore, the Commission began a review of all active ingredients used in plant protection products in the EU. The review is scheduled to be completed in 2008. Since 2003, the risk assessments associated with these authorizations have been conducted by the new European Food Safety Authority.

Although the setting of residue levels and the authorization of pesticides are at the core of the current regulatory regime, Europe is on the verge of moving towards a more comprehensive regulatory regime. The EU has recognized that residue limits and pesticide authorizations have not significantly reduced the use of pesticides in Europe. The EU’s Sixth Environmental Action Programme established a goal of reducing pesticide use (“Plant protection product use reduction”). In response, the European Commission has proposed a legal framework that would set the EU on the path of much
more extensive involvement in pesticide regulation. The Commission sent its draft directive—the “Thematic Strategy on the Sustainable Use of Pesticides”—to the Parliament and the Council in 2006. In October 2007, Parliament amended the Commission’s draft directive, extending the list of banned “active substances” to include neurotoxins and immunotoxins (the Commission’s draft directive banned endocrine disruptors). However, in March 2008, the Commission submitted a revised directive that removed neurotoxins and immunotoxins from the list of banned substances.  


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**Directive 91/414/EEC and 98/8/EC: Pesticide and Biocide Registration**

Directive 91/414/EEC of 15 July 1991 “…intends to prevent risks at source through a very comprehensive risk assessment procedure of each active substance and the products containing the substance, before they can be authorized for marketing and use.” After 91/414/EEC authorizes use of a product, they have to be authorized by Member States for marketing in each country.

The goal of 91/414 is to harmonize the authorization of plant protection products. Member states can only authorize plant protection products containing active ingredients listed in Annex 1. Pesticide products authorized before July 25th, 1993 must be newly reviewed for toxicity and environmental fate. 800 pesticide active ingredients are undergoing reevaluation. Manufacturers have to finance toxicity tests and submit specific decisions. For some products, these tests were too expensive given market value (340 active ingredients). After July 2003, therefore, these ingredients could no longer be marketed. The OECD reports that since 1994, an additional 462 active substances have

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been withdrawn from the market, either because they have not proven to be safe under the conditions of use supported by an applicant or because they were not supported for inclusion in Annex I to Directive 91/414/EEC. One hundred active substances were included in Annex I on the base of a common dossier on Community level, which proved that they can be safely used. Five hundred active substances are still under evaluation. (OECD 2006).

Council Directive 98/8/EC regulates the use of biocides and is modeled on 91/414/EEC. A biocide is a product used to kill organisms, but is distinguished from “plant protection products” in the EU lexicon. For example, a biocide might be used to treat wood to prevent insect damage. Like 91/414/EEC, this Directive establishes a series of “annexes” to list biocides that are approved for marketing.

Council Directive 98/83/EC sets maximum limits for contamination of drinking water with pesticides

**EU Regulation of Pesticide Residues**

Pesticide residues in food are regulated by Regulation (EC) N 396/2005, which consolidates and amends four earlier Council Directives.⁴ EU member-states cannot impose higher standards.

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The EU has also established a European program for monitoring residues. This program has operated since 1997 (European Commission 2007a). The goal of the coordinated monitoring program is ultimately to identify “actual dietary pesticide exposure throughout Europe” (European Commission 2007a).

*Thematic Strategy on the Sustainable Use of Pesticides*

Despite the implementation of Directive 91/414/EEC, the EU’s Sixth Environmental Action Programme responds to the following dilemma: despite the increasing costs associated with pesticide authorization and the fewer approved pesticides, pesticide use in the EU has not declined. The use of plant protection products did not decrease between 1992 and 2003 (EU Commission, 2006, Communication on Thematic Strategy) and approximately five percent of food and feed samples still contained pesticide residue levels that exceeded maximum regulatory limits.

Consequently, the Sixth Environmental Action Programme mandated the design of a “thematic strategy” for reducing pesticide use. Building on a project the EU conducted with the Dutch called “Sustainable Use of Pesticides,” which began in 1992, the European Commission adopted a “Communication” in 2002: “Towards a Thematic Strategy on the Sustainable Use of Pesticides.” This Communication initiated a stakeholder consultation, which eventually led to proposed legislation for reducing pesticide use, which was conveyed to Parliament in 2006.

The Thematic Strategy is designed to address the use of allowable pesticides, which were not really considered in the prior legal framework on authorizations and
pesticide residues. In developing the Thematic Strategy, the EU is trying to move toward a regime that proactively tries to reduce the use of pesticides and to reduce overall risks. The cornerstones of the Thematic Strategy are National Action Plans (European Commission 2007, 14), which are frameworks for implementing the thematic strategy at the national level. Member States are charged to establish plans to reduce hazards, risks and dependence on chemical control for plant protection. Within this framework, individual Member States will still be able to set up their own targets and timetables, according to the structure of their agricultural sector, climatic and geographical conditions, existing national legislation and programs. The Thematic Strategy indicates that stakeholders must be involved in establishing and implementing the national plans.

The Thematic Strategy also proposes a number of specific measures that should be incorporated into the National Action Plans. A system for training professional pesticide users should be created and compulsory inspection of existing application equipment should be introduced. Safe storage and handling conditions should also be established. Aerial spraying should be limited to highly circumscribed situations where alternatives are not possible. Aquatic environments should receive special protections and areas of zero pesticide use should be designated. In addition to these measures, the Thematic Strategy also seeks to promote low pesticide farming through the use of Integrated Pest Management (IPM) strategies. The Thematic Strategy also promotes a whole range of strategies to increase information on the effectiveness of regulation and the extent of pesticide use and contamination. These strategies include monitoring of compliance with EU legal requirements, expansion of monitoring programs for food and feed, the evaluation of the reporting of pesticide poisoning incidents, collection of
pesticide sales and use data, and the development of a system of indicators to measure progress toward reduction of pesticide use. Finally, the Thematic Strategy proposes the use of “comparative assessment” and the “substitution principle” for evaluating pesticides; these principles encourage decisionmakers to compare the relative risks of different pesticides and to encourage the substitution of less risky ingredients. The Draft Directive submitted by the Commission to Parliament in 2006 is designed to implement those parts of the Thematic Strategy that require new legislation.

In October 2007, the Pesticide Action Network Europe published a pesticide residuals analysis of 8 fruits purchased at the grocery story in the European Parliament building! They found that the oranges, grown in Spain, had the highest concentration of pesticide residues and in two cases these residues exceeded maximum residue limits. Grapes from Italy and Egypt and apricots of unknown origin each exceeded maximum residue levels for one pesticide. PAN Europe released their report as the European Parliament was discussing proposed legislation from the Europe Commission on the reduction of pesticide use (Pesticide Action Network Europe 2007).

**California Pesticide Regulation**

California’s pesticide programs must be understood within the context of the structure of U.S. federal pesticide programs. Under the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA), the Environmental Protection Agency (EPA) has responsibility for regulating the registration, sale, and use of pesticides in the U.S. FIFRA, however, has a long history of policy turmoil and ineffectiveness that stem from the structure of the program, political conflict between agricultural and environmental interests, and the
magnitude of the problem (Bosso 1987; Hoberg 1990; Cropper et al. 1992). In this policy context, state pesticide programs often complement and extend federal regulation, sometimes creating more stringent programs for the registration, manufacture, and use of pesticides. California claims to have the strictest pesticide laws and regulations in the U.S and has a long history of enacting tougher pesticide regulatory standards than the federal government. After the revision of FIFRA in 1972, California created more stringent reporting requirements for registration of pesticides. The state was sued by the National Agricultural Chemical Association in 1980, which claimed that the federal law prevented states from imposing their own registration requirements. A federal district court ruled in favor of California.

In 1991, the pesticide program was given departmental status within the Cal Environmental Protection Agency (Cal EPA). The California Department of Pesticide Regulation (DPR) is a large and sophisticated regulatory agency that claims to be distinctive among American States: “California is the only pesticide regulatory program in the country with a large and highly regarded scientific and technical staff that evaluates toxicology, environmental and other data required for pesticide registration, and conducts comprehensive risk assessments, including assessment of dietary risk” (CDPR, 2001, 11). The reason, DPR claims, is the scale and complexity of agriculture in California: “The agricultural chemical problems in California are more numerous and more complex than in most other states. Farmers of California produce more than 200 different commercial crops in a terrain that includes the highest and the lowest altitude in the United States.” (CDPR, 2001, 70). The State also uses a lot of pesticides, though use has stabilized at
around 200 million pounds of active ingredients per year (PAN California Pesticide Use Data Base).

**Pesticide Registration**

The review of pesticides for registration in California is quite comprehensive and requires consideration of 1) serious, uncontrollable adverse effects on the environment; 2) greater detriment than benefit to the environment; 3) harm to vegetation, domestic animals, or public health and safety; and 4) uses deemed to hold little or no value. The product is reviewed to assure that it will cause no harm or adverse impact to non-target organisms that cannot be reduced or mitigated with protective measures or use restrictions.

California’s regulations are “far more comprehensive” than EPA’s (DPR 2001, 45). “DPR requires efficacy data be submitted as part of an application for registration. U.S. EPA requires manufacturers to develop such data but waives its submission, except for products with public health issues, such as disinfectants. DPR also sometimes denies registration to products approved by U.S. EPA. The Department may base such decisions on toxicology or environmental studies judged to be inappropriate or inadequate, label instructions that fail to mitigate possible hazards, or inadequate margins of safety.

California has a restricted materials permit program that grew out of an attempt to make pesticide registration compatible with California’s Environmental Quality Act. (permits to apply restricted materials are the functional equivalent of environmental impact reports.) County Agricultural Commissioners administer the restricted materials
permitting system and enforce other state laws and regulation regarding pesticide use at the local level.

In 1988, FIFRA was amended to speed up pesticide reregistration (FIFRA requires review and “reregistration” of all existing pesticides). Pesticide registration has placed a burden on the DPR and it has cooperated with EPA to expedite reviews. In 1993, California legislation established an interim registration process that allowed DPR to waive or delay certain data requirements for federally registered pesticides that meet specified criteria. Efficacy data and ground water studies can be waived if the product would reduce risks when used in a pest management system. The product must reduce risks to workers, public health, or the environment, lessen the risk of pest resistance problems, or reduce a substantial risk of economic loss as a result of pest infestation for which there is no feasible control. (Note that this last point is close to the idea of “comparative assessment” that the EU’s Thematic Strategy hopes to introduce.)

Regulating and Monitoring Pesticide Residues and Use

In California, the focus on pesticide risk assessment grew out of the 1984 passage of the Birth Defect Prevention Act (CDPR 2001, 35). This Act prompted the creation of the Medical Toxicology Branch and required that DPR not register new active ingredients without comprehensive study and required that registration of older chemicals be brought up to current scientific standards. “To fulfill the mandates of the BDPA, DPR established a procedure to prioritize all pesticides for risk assessment, placing them in high, moderate, or low-priority status” (CDPR 2001, 36). Before 1996, DPR treated older
chemicals and new chemicals according to a distinctive risk assessment process. But after 1996, these two risk assessment processes were integrated into a single priority list.

The first residue-monitoring program began in California in 1927, as the result of a threatened British embargo of US fruit that resulted from illnesses among British consumers eating American fruit (1927 Chemical Spray Residue Act). Laws passed in 1967 and 1983 strengthened to right of California’s Agriculture Director to review federal tolerances and adopt them in the State, or to set more stringent tolerances.

The 1980s was a period of concern about the efficacy of residue monitoring programs and a variety of reports appeared criticizing government monitoring programs. After a critical report from the Little Hoover Commission in 1985, DPR expanded its residue monitoring system. DPR’s Pesticide Enforcement Branch claims to be the nation’s largest state pesticide residue monitoring program. During the 1980s, California began a pre- and post-harvest sampling program for evaluating pesticide residues. However, this program was discontinued in the 1990s, according to DPR, because monitoring data showed low detectable residues and few violations.

The State also has several other important monitoring programs. The DPR has a Pesticide Illness Surveillance Program that claims to be “…the nation’s most comprehensive pesticide-illness monitoring systems” (CDPR 2001). The Environmental Monitoring Branch also monitors pesticides in the environment, identifying hazards and developing pollution prevention strategies.

In 1990, the pesticide use reporting requirements were expanded to include all applications to food crops and to other applications as well (limited reporting goes back to 1950). “California’s pesticide use reporting program is internationally recognized as
the most comprehensive of its kind. DPR annually collects and processes more than 2.5 million records of chemical applications” (CDPR 2001). The Food Safety Act of 1989 established the DPR’s authority to require pesticide use reporting.

Pesticide Risk Management and Reduction

In 1994, DPR created the Integrated Pest Management Innovator award program, recognizing growers who are developing alternative methods of pest management. DPR claims to be one of the few government agencies in the US awarding grants for the development of innovative pest management practices. It expanded this program in 1998 to create a program of public-private alliances that aim to reduce pesticide risks to workers, consumers, and the environment. DPR has a legal mandate to encourage more environmentally sound pest management systems, including integrated pest management.

Air, Water, Environmental, and Workplace Protection

California has a number of programs that aim to protect the environment and workers from pesticides. DPR has created methodologies to develop a more preventive basis for protecting groundwater from pesticide contamination and it conducts air monitoring and evaluation under its Toxic Air Contaminant Program. DPR also has ground and surface water protection programs. The program to address pesticide contamination of groundwater began in the early 1980s as the result of discovery of widespread contamination. The Pesticide Contamination Prevention Act of 1985 emphasizes the
detection of contaminated ground water sources. Where contamination is found, DPR and the Department of Health Services take remedial action. In 1999-2000, DPR expanded its surface water program to monitor pesticide residues in the state’s water bodies and to develop site-specific strategies to keep pesticides out of California waterways.

DPR established a Pesticide Workplace Evaluation Program in 1999, to help County Agricultural Commissioner staff to identify workplace hazards during their routine compliance inspections.

**Past and Possible Regulatory Cooperation**

Cooperation between the EU and California on pesticide regulation has been limited, but cooperation in the future might take place in a number of areas.

- Scientific and technical cooperation is one area in which some regulatory cooperation between the EU and California can already be detected. For example, “DPR staff are currently working with U.S. EPA, Health Canada, and the European Union (EU) to develop standardized statistical methods for establishing pesticide tolerances using residue data” (CDPR 2001). The OECD has been a leader in promoting international regulatory cooperation in pesticide regulation. Given the high cost and lengthy process of scientific evaluation of pesticides, they are strongly encouraging burden-sharing in this area. In identifying opportunities for international collaboration, an OECD report notes: “An area for international collaboration could be the risk assessment for active
substances. Models used for risk assessment could be developed and improved in collaboration and data and findings obtained by monitoring programs could be shared.”

The DPR claims it is critical for the agency to “stay abreast of the emerging global approach to risk assessment represented by the Organisation for Economic Cooperation and Development’s (OECD) monograph system” (CDPR 2001). DPR claims to participate in “national and international development of exposure assessment guidelines” (CDPR 2001).

● Some limited cooperation can also be detected around harmonization of standards. For example, both the DPR, the European Commission, and the European Union participated as observers in a NAFTA harmonization consultation between the US EPA and Health Canada (Canada Pest Management Regulatory Agency 2005, 1). The EU has outlined cooperation with Canada on pesticide issues that would include sharing of best practices, exchange of information on regulatory developments and pesticide registration and evaluation.5 Similar types of regulatory cooperation could be developed with California.

● In some areas, the EU has more stringent regulatory standards and a more precautionary approach on pesticides than the U.S. In an international comparison of residue standards on the EU, the US, Canada, and Australia, the David Suzuki Foundation (2006) found that the EU “clearly had the strongest standards (i.e. the lowest MRL) for the majority of the pesticide/food combinations examined”—in many cases “by a substantial margin” (2006, 17). The State of California has often taken a more

precautionary stance toward pesticide health effects than the U.S. EPA. For example, the State of California joined with other parties to sue the EPA for its interpretation of a statute that prohibits residues of known carcinogens in food. Before 1995, the EPA interpreted the Delaney Clause as allowing exceptions where risks were minimal. The State of California v. Browner found that the Delaney Clause did not permit such exceptions. Since California has been a leader in regulatory standard setting on pesticides in the U.S. and sometimes sets higher standards that the U.S. EPA, E.U.-California cooperation could exert pressure on the U.S. EPA to raise standards.

● In some cases, we see implicit cooperation between California and the EU. The Copper Antifouling Paint Sub-Workgroup was clearly aware of efforts by industry and the EU to examine boat paint composition and sought out information from the EU (Cooper Antifouling Sub-Workgroup 2005).

● An area of emerging concern in the EU is the issue of endocrine disruptors, where the EU has explicitly adopted a precautionary approach (European Commission 1999). As in other areas where the EU forcefully advocates a precautionary approach, international conflict is a possible result. For example, conflict is looming on the use of Atrazine, one of the most common agricultural pesticides and an endocrine disruptor. The EU bans atrazine, while it remains in use in the US (Sass and Colangelo 2006). Although California does not currently prohibit Atrazine, a possibility exists for regulatory cooperation. California was the first state to ban flame retardant chemicals (PBDEs) that are potential endocrine disruptors (AB 302; signed August 9, 2003). The EU is seeking to
position itself as an international leader on endocrine disruptors (Institute of Environment and Health 2003) and the EU strategy (European Commission 1999) explicitly calls for international cooperation and coordination. Jason Vogel (2004) has argued that the U.S. endocrine disruption program fails because it is mired in a “scientific testing and regulation paradigm” that places an unsurmountable burden on regulators to prove negative health effects. Federal failure creates possibilities for state-level policy innovation.

Another area in which cooperation might take place is in the development of pesticide use reporting. Pesticide Action Network Germany has called on the EU to develop a pesticide use reporting system and investigated the strengths and weaknesses of California’s pesticide use reporting system. California has the oldest reporting system in the world. In 1967, the California legislature adopted a statute require commercial pest control operators to keep pesticide use records. From 1972 to 1990, commercial pest control operators had to file each pesticide application as written reports with the County Agricultural Commissioner. Farmers had to file use reports within 7 days. In 1990, a full reporting system was introduced in California. The data created by this reporting system are powerful for identifying priorities for pesticide risk reduction. In the EU, only the UK has a pesticide use reporting system (as of PAN Germany’s 2002 report).

In launching the “Thematic Strategy,” the EU is moving towards a strategy of trying to reduce overall use of pesticides and to reduce pesticide risks where use continues. A number of EU member-states have progressive “risk reduction” programs that the EU can
build upon.\textsuperscript{6} However, California’s program of risk reduction might be of some interest to the EU as it develops this strategy. California’s program to promote Integrated Pest Management might be of particular interest. While in the early phases of development, California’s “Green Chemistry” initiative may also create opportunities for EU-California cooperation relevant to reduction of pesticide risks.

**International Pesticide Regulation**

The EU and California might also cooperate in the context of an emerging international regulatory regime for pesticides. Indeed, as a powerhouse of American agriculture, it is important to encourage California’s cooperation on the international level is particularly. Methyl bromide provides an example of California’s importance to international cooperation. A pesticide used extensively for protecting tomatoes and strawberries in California, methyl bromides were found to be ozone-depleting. A global meeting in Copenhagen in 1991 agreed to cap methyl bromide at 1991 levels and the 9\textsuperscript{th} meeting of Montreal Protocol in 1997 agreed to phase the use of the chemical out after 2005 in developed countries (2015 for developing countries; the U.S. had actually agreed to a 2001 phase out; Hough 2003). However, the phase out allowed for exemptions and California strawberry growers have featured prominently in the annually designated exceptions to the ban. Carter et al., (2005) have estimated that the ban will cost California between 6\% and 17\% in revenue.

\textsuperscript{6} See a series of PAN reports. The Scandanavia countries seem to have the most stringent risk regimes (David Suzuki Foundation 2006) and also to be most aggressive in promoting reduction of risk.
The most important element of global regulation of trade in pesticides is the Prior Informed Consent (PIC) Procedure. Established at the 1998 Rotterdam Convention, this agreement creates legally binding commitments to inform importers of the ban on the pesticide within the exporting country (Hough 2003, 15). The Netherlands was the first country to embrace PIC and the EU eventually incorporated the PIC procedure into European law in the 1990s. Although the U.S. was actively engaged in the promotion of the Rotterdam Convention, they have not yet ratified it (the Convention took effect in 2004).

The Center for International Environmental Law (CLIE) argues that U.S. states like California play a particularly important leadership role when the U.S. fails to ratify international treaties. For example, in the case of the yet-to-be ratified Stockholm Convention on Persistent Organic Pollutants (POPs), CLIE argues that California’s ban on PBDE reveals the leadership role that California can play within the U.S. on issues of international importance. They also note that California’s ban followed the lead of the EU (Center for International Environmental Law 2005).
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