

September 1990

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Recommended Citation

L. Alenna Bolin, *An Ounce of Prevention: The Need for Source Reduction in Agriculture*, 8 Pace Envtl. L. Rev. 63 (1990)

DOI: <https://doi.org/10.58948/0738-6206.1599>

Available at: <https://digitalcommons.pace.edu/pelr/vol8/iss1/4>

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An Ounce of Prevention: The Need for Source Reduction in Agriculture

L. Alenna Bolin*

The federal government acknowledges that the best policy for dealing with the nation's growing hazardous waste problem is to prevent the pollution before it occurs. After historically supporting programs aimed at pollution control, recent actions indicate a resurgence of pollution prevention, or source reduction, efforts. This article discusses the need to incorporate the agricultural industry into these source reduction efforts. Chemical-intensive modern agriculture has become the single largest nonpoint source of pollution. Existing environmental laws do not effectively regulate the use of pesticides. Source reduction principles can be incorporated into modern agriculture through support of an organic system of production. In order to remove the barrier to farmers' voluntary conversion to nonchemical systems, the author proposes a two-tiered organic crop insurance program. The program would offer: 1) complete indemnification for farmers during the risky transition period, and 2) post-transition insurance structured like the existing federal crop insurance program.

I. Introduction

Noted scientist and activist Barry Commoner recently

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wrote a thoughtful and insightful article addressing the "need to confront the root causes of environmental degradation" — our technologies of production.¹ He focused on the huge and growing toxic chemical and hazardous waste problem that our current technologies of production are creating. His description of the threat to human health is both frightening and angering. For instance, he explained that the average American now carries several dozen synthetic chemicals, some of them carcinogenic, in his or her body fat.²

Dr. Commoner observed that most environmental protection efforts have failed and are bound to fail.³ Yet, looking back over the past two decades, he was able to conclude that "it is indeed possible to reduce the level of pollution sharply."⁴ Why have we achieved so few successes? He stated that "[t]he few real improvements have been achieved not by adding control devices or concealing pollutants [as waste] . . . but simply by eliminating the pollutants."⁵ For example, after the insecticide DDT was banned for agricultural use in this country, DDT levels in body fat decreased seventy-nine percent.⁶

1. Commoner, *A Reporter at Large - The Environment*, THE NEW YORKER, June 15, 1987, at 46, 66 [hereinafter Commoner]. This article expands on some of the ideas in his book *The Closing Circle*, which he first published 16 years earlier. B. COMMONER, *THE CLOSING CIRCLE* (1971). In *The Closing Circle*, Dr. Commoner examined the origins of the environmental crisis, focusing on the role of technology in society. He asserted that modern technology was an ecological failure because decision-makers used it to solve specific problems in isolation from the whole ecological system. See generally *id.* at 178-215. In the article, he continues to advocate a systems approach (an aspect of source reduction). However, he has shifted his emphasis to the more political question of "how the choice of production technologies is to be determined." Commoner, *supra*, at 71. For a critical discussion of the politics behind the choice of production technologies in the electronics industry, see Hayes, *Highest Disregard*, MOTHER JONES, Dec. 1989, at 33. Although it was known that chlorofluorocarbons (CFCs) shred stratospheric ozone, and proven that alternatives were available, the electronics industry "came to rely on CFCs as the chemical of choice in many operations and built whole new technologies" around them and is now trying to block legislation to eliminate CFCs. *Id.* at 34.

2. Commoner, *supra* note 1, at 52.

3. See generally *id.* at 46-71.

4. *Id.* at 49.

5. *Id.* at 56.

6. *Id.* at 57.

Since at least the mid-1970's, pollution prevention has been recognized as the most preferable method of dealing with the problem.⁷ Historically, however, attempts to deal with the problem of toxic chemicals have focused on pollution control rather than pollution prevention.⁸ According to Dr. Commoner, such efforts are "ultimately self-defeating."⁹ Recent government actions, however, indicate a revitalization of the concept of pollution prevention, or source reduction.¹⁰ Whatever the label, the essence of source reduction is the reduction of hazardous waste at its source by changing the industrial or production process and by eliminating the use of hazardous or toxic materials.¹¹ That is exactly the change called for by Dr. Commoner.

Any comprehensive source reduction program must necessarily include all sources of hazardous waste, whether industrial or agricultural, to be fully effective. Since World War II, agriculture has become increasingly chemical-intensive. In fact, agriculture today is a significant source of water pollution.¹² Government intervention is necessary to stimulate voluntary source reduction efforts in the agricultural industry, as well as in other industries. The government may be headed in a direction which limits the scope of source reduction to factory or plant-type industry. There is no reason to exclude agricultural pollution from source reduction efforts.

This article will discuss the need to incorporate the agricultural industry into source reduction efforts and propose an incentive towards that goal. Part II will discuss the growing hazardous waste problem in this country, in which agriculture plays a part, and will trace government policy and actions dealing with the problem. Part III will discuss the extent of agricultural chemical pollution and the failure of the current

7. See *infra* text accompanying notes 24-27.

8. See *infra* text accompanying notes 28-30.

9. Commoner, *supra* note 1, at 56.

10. This article will use the terms "pollution prevention," "source reduction," "waste reduction," and "toxics use reduction" interchangeably.

11. See *infra* text accompanying notes 53-55.

12. NATIONAL RESEARCH COUNCIL, ALTERNATIVE AGRICULTURE 89 (1989) [hereinafter ALTERNATIVE AGRICULTURE].

regulatory system to protect the environment from agricultural chemical pollution. The primary focus of this article will be on the threat that agricultural chemicals pose to groundwater, although their use raises equally serious environmental concerns such as food safety and farmworker safety. Part IV will conclude that organic crop insurance can provide an incentive to incorporate source reduction principles into agriculture. This article will propose a two-tier organic crop insurance program as a framework for legislative or regulatory action. The program would offer: 1) insurance that would provide complete indemnification for farmers during a prescribed period of transition from chemical to nonchemical farming methods, and 2) post-transition insurance that would be structured much the same as the current federal crop insurance program.

II. Source Reduction

United States industry generates almost six hundred billion pounds of hazardous waste, as defined by the Resource Conservation and Recovery Act (RCRA),¹³ annually.¹⁴ In addition, billions of pounds of non-RCRA hazardous waste are discharged into the air and water annually.¹⁵ Chemical waste from normal agricultural use falls into the latter category.¹⁶ In agriculture, current conventional production processes are chemical-intensive, and thus agriculture contributes to the nation's hazardous waste problem.

Wastes in both categories represent not only a serious threat to human health and the environment,¹⁷ but also enor-

13. 42 U.S.C. §§ 6901-6992 (1988). Under RCRA, "hazardous waste" is defined as solid waste which may either cause or contribute to an increase in mortality or serious irreversible illness or pose a hazard to human health or the environment when improperly treated, stored, transported, or disposed of. *Id.* § 6903(5).

14. MUIR & UNDERWOOD, PROMOTING HAZARDOUS WASTE REDUCTION: SIX STEPS STATES CAN TAKE 1 (1987) [hereinafter INFORM Report].

15. *Id.*

16. RCRA expressly exempts "solid or dissolved materials in irrigation return flows" from the definition of solid wastes. 42 U.S.C. § 6903(27). This includes runoff to surface waters and leaching to groundwater.

17. See generally S. EPSTEIN, L. BROWN, & C. POPE, HAZARDOUS WASTE IN AMERICA (1982) [hereinafter HAZARDOUS WASTE IN AMERICA] (examines case studies of

mous economic inefficiency and potential liability.¹⁸ Equating waste with inefficiency, one report states that reduction of wastes conserves scarce, strategic, or expensive materials; reduces costs of complying with hazardous waste regulations and cleaning up toxic waste sites; and lowers insurance rates.¹⁹ Years from now, cleaning up a site and compensating victims could cost ten to one hundred times what the alternatives would have cost to prevent the releases in the first place.²⁰ Agriculture is not immune from such waste. A ten-year study concluded that the farmers of one state were spending \$5 million a year on unnecessary pesticides to deal with three pests on one crop.²¹

On the other hand, waste reduction can increase the efficiency and profitability of an operation.²² For example, one company's "unrelenting" pollution prevention efforts saved it more than \$400 million over a fifteen-year period.²³ This sum represents pollution control facilities that the company did not have to build; reduced pollution control operating and disposal costs; reduced manufacturing costs, including energy costs and materials inventory; and retained sales of products that otherwise might have been forced off the market as environmentally unacceptable.

A. *Pollution Prevention Policy*

The federal government has acknowledged that the best policy is to prevent pollution before it occurs. In 1976, the Environmental Protection Agency (EPA) published a position

hazardous waste problems and impacts on human health and the environment).

18. U.S. CONG., OFFICE OF TECHNOLOGY ASSESSMENT, *SERIOUS REDUCTION OF HAZARDOUS WASTE: FOR POLLUTION PREVENTION AND INDUSTRIAL EFFICIENCY* 21-23 (Sept. 1986) [hereinafter *SERIOUS REDUCTION*].

19. *Id.* at 21.

20. *Id.*

21. D. HOWELL, *ORGANIC AGRICULTURE: WHAT THE STATES ARE DOING* 17 (1989) [hereinafter *CSPI Report*] (published by the Center for Science in the Public Interest).

22. *SERIOUS REDUCTION*, *supra* note 18, at 14; Wann, *A National Challenge that Keeps Piling Up*, *Christian Science Monitor*, Aug. 9, 1989, at 19, col. 3.

23. *SERIOUS REDUCTION*, *supra* note 18, at 14; Wann, *supra* note 22. The company, 3M, is a leader in industrial source reduction. *Id.*

statement which offered a preferred waste management hierarchy to protect health and the environment.²⁴ Waste reduction, implemented through "process changes," was at the top of the list.²⁵ Following waste reduction on the hierarchy, in order of descending priority, were waste separation and concentration; waste exchange; energy and material recovery; incineration or treatment; and land disposal.²⁶ Later, in the 1984 RCRA amendments, Congress declared it to be "the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible."²⁷

Actual practice, however, departed from policy. Both the government and chemical companies have focused on waste management, rather than waste reduction.²⁸ Although at the very bottom of the waste management hierarchy, land disposal has become the standard method for disposing of hazardous waste because it is the easiest and cheapest, at least in the short-term.²⁹ Government has not provided financial support for pollution prevention. "[L]ess than 1% of annual environmental spending by Federal and State governments [has been allocated] for pollution prevention."³⁰

These approaches have failed. The United States Office of Technology Assessment stated that "to an unacceptable degree, hazardous waste management involves disposal or dispersal of waste into the environment."³¹ No landfill is completely secure; toxic leachate inevitably escapes and contaminates soil and groundwater.³² Pollution controls are

24. 41 Fed. Reg. 35,050 (1976).

25. *Id.*

26. *Id.* at 35,050-51.

27. Hazardous and Solid Waste Amendments of 1984, Pub. L. No. 98-616, tit. 1 § 101(6), 1984 U.S. CODE CONG. & ADMIN. NEWS (98 Stat.) 3224 (codified as amended at 42 U.S.C. § 6902 (1988)).

28. INFORM Report, *supra* note 14, at 4, 7; SERIOUS REDUCTION, *supra* note 18, at 8, 27; 54 Fed. Reg. 3846 (1989).

29. HAZARDOUS WASTE IN AMERICA, *supra* note 17, at 6, 317, 355.

30. Oldenburg & Hirschhorn, *Waste Reduction: From Policy to Commitment*, 4 HAZARDOUS WASTE & HAZARDOUS MATERIALS 6 (1987).

31. SERIOUS REDUCTION, *supra* note 18, at 29.

32. HAZARDOUS WASTE IN AMERICA, *supra* note 17, at 355-57.

ultimately self-defeating because they cannot capture all contaminants and they cannot be used at all for pollution from nonpoint sources.³³ Waste treatment frequently results in transferring the waste from one medium to another, which perpetuates the hazardous waste problem, such as incinerating solid waste which ends up polluting the air.³⁴ Further, the current regulatory system sanctions a certain amount of waste which "can accumulate to environmentally unacceptable levels when postpollution control discharges from many generators enter the environment."³⁵

The problem is particularly onerous with respect to groundwater pollution.³⁶ Groundwater provides drinking water to over half of the nation's total population and 97% of the rural population and supplies 35% of municipal water needs.³⁷ Thus, a significant part of the population is exposed to contaminated water. Exposure to contaminated groundwater does pose documented and suspected risks to human health.³⁸ Everyone agrees that cleaning up groundwater con-

33. Commoner, *supra* note 1, at 56. The Federal Water Pollution Control Act of 1972, 33 U.S.C. §§ 1251-1387 (1988), defines a "point source" as "any discernible, confined and discrete conveyance." 33 U.S.C. § 1362(14). By contrast, "nonpoint" source pollution is diffuse and does not emanate from a discrete, identifiable point of discharge. Nonpoint source pollution includes agricultural chemicals that reach water after field applications. 2 W. RODGERS, JR., ENVIRONMENTAL LAW 124 (1986).

34. 54 Fed. Reg. 3846 (1989).

35. SERIOUS REDUCTION, *supra* note 18, at 29.

36. One writer aptly described a groundwater aquifer as an "underground sponge composed of deposits of sand, gravel or other unconsolidated materials, fractured rock, or cavernous limestone." THE CONSERVATION FOUNDATION, GROUNDWATER PROTECTION - A GUIDE TO GROUNDWATER POLLUTION 53 (1987) [hereinafter CONSERVATION FOUNDATION]. For a brief discussion of the hydrogeology of groundwater aquifers and the movement of contaminants within them, see *id.* at 53-63.

37. THE CONSERVATION FOUNDATION, GROUNDWATER PROTECTION - GROUNDWATER: SAVING THE UNSEEN RESOURCE 9 (1987) [hereinafter National Groundwater Policy Forum Final Report].

38. E. NIELSON & L. LEE, THE MAGNITUDE AND COSTS OF GROUNDWATER CONTAMINATION FROM AGRICULTURAL CHEMICALS: A NATIONAL PERSPECTIVE 1 (U.S. Department of Agriculture, Agricultural Economic Report No. 576, Oct. 1987); CALIFORNIA STATE ASSEMBLY OFFICE OF RESEARCH, THE LEACHING FIELDS: A NONPOINT THREAT TO GROUNDWATER 2 (Mar. 1985) [hereinafter THE LEACHING FIELDS]. Assessing the risks from drinking contaminated groundwater would involve what one writer terms "science policy questions." These are questions that science cannot resolve as a factual matter, but rather must be decided as a matter of policy. See McGarity, *Substantive*

tamination is a difficult, if not impossible task.³⁹ Even if cleanup is possible, it can be prohibitively expensive.⁴⁰ Figuring out the extent of the problem itself is expensive. One study determined that the annual cost of monitoring the twelve to fourteen million private wells in the country could cost at least \$7 billion.⁴¹ Finally, if remedial actions are not or cannot be taken, contamination "can persist for years or even centuries."⁴²

Perhaps more importantly, the current regulatory emphasis on waste management weakens the incentive to reduce waste.⁴³ Indeed, the 1984 RCRA amendments did not encourage source reduction because they failed to provide positive incentives.⁴⁴ The regulatory system has spawned a whole waste management infrastructure. Now the familiarity of the current system impedes innovative new changes.⁴⁵

Recent government action, however, reflects a revitalization and reaffirmation of the concept of pollution prevention. In the summer of 1988, the EPA established an Office of Pollution Prevention (OPP).⁴⁶ Its main goal is to encourage the development and implementation of state source reduction programs.⁴⁷ Although not a substantial part of EPA's budget,⁴⁸ financial support has been provided. The OPP has

and Procedural Discretion in Administrative Resolution of Science Policy Questions: Regulating Carcinogens in EPA and OSHA, 67 GEO. L.J. 729, 732-42 (1979).

39. National Groundwater Policy Forum Final Report, *supra* note 37, at 11. In deciding what agricultural system to support, decision-makers should be guided by "the reversibility of harms that can flow from an erroneous decision." McGarity, *supra* note 38, at 737.

40. E. NIELSON & L. LEE, *supra* note 38, at 1.

41. U.S. CONG., OFFICE OF TECHNOLOGY ASSESSMENT, PROTECTING THE NATION'S GROUNDWATER FROM CONTAMINATION 10 (Oct. 1984).

42. E. NIELSON & L. LEE, *supra* note 38, at 1.

43. SERIOUS REDUCTION, *supra* note 18, at 8.

44. Note, *Legal Incentives for Reduction, Reuse, and Recycling: A New Approach to Hazardous Waste Management*, 95 YALE L.J. 810, 814 (1986).

45. SERIOUS REDUCTION, *supra* note 18, at 27.

46. *New Pollution Prevention Office at EPA May Draw on Several Laws to Achieve Goals*, 19 Env't Rep. (BNA) 384-85 (Oct. 21, 1988).

47. *Id.*

48. EPA's total estimated budget for 1989 was over \$5 billion. Its estimated budget authority for 1989 for research and development in pollution control and abatement, and for abatement, control, and compliance (excluding Superfund) was

made available \$7 million in grants for projects to carry out pollution prevention objectives, \$3.8 million of which was awarded by the spring of 1989.⁴⁹

In January 1989, EPA published its proposed "Pollution Prevention Policy Statement."⁵⁰ The notice "commits EPA to a preventive program to reduce or eliminate the generation of potentially harmful pollutants."⁵¹ The EPA acknowledged the weaknesses of the current regulatory system when it stated that "government and industry are beginning to realize that end-of-pipe pollution controls alone are not enough. Significant amounts of waste containing toxic constituents continue to be released into the air, land, and water, despite stricter pollution controls and skyrocketing waste management costs."⁵²

B. *What Is Source Reduction?*

Source reduction prevents pollution before it occurs. It reduces wastes by attacking their source. Source reduction is not achieved by transferring hazardous substances from one environmental medium to another, concentrating waste solely to reduce volume, diluting the substance to reduce toxicity,⁵³ or eliminating the use of one toxic substance only to replace it with another.⁵⁴ Essentially, two types of changes will lead to source reduction:⁵⁵

- 1) Reducing or eliminating the use of hazardous or toxic

almost \$868 million. OFFICE OF MANAGEMENT & BUDGET, BUDGET OF THE U.S. GOVERNMENT—FISCAL YEAR 1990, at 9-148 to -50.

49. 54 Fed. Reg. 21,281 (1989).

50. 54 Fed. Reg. 3845 (1989).

51. *Id.* But see Commoner, *Real Pollution Solutions*, Sacramento News & Review, Nov. 22, 1989 at 14, 15, reprinted from GREENPEACE MAGAZINE Sept./Oct. 1989 (questioning EPA's commitment to pollution prevention after EPA turned down citizen demands that proposed trash-burning facility employ best available control technology).

52. 54 Fed. Reg. 3846 (1989).

53. 54 Fed. Reg. 25,056 n.2 (1989).

54. Commoner, *supra* note 1, at 57.

55. CALIFORNIA LOCAL GOVERNMENT COMMISSION, MINIMIZING HAZARDOUS WASTES - REGULATORY OPTIONS FOR LOCAL GOVERNMENT 1 (1988); SERIOUS REDUCTION, *supra* note 18, at 9.

substances. This may be accomplished by substituting the raw materials of production, substituting products, or reformulating or redesigning end-products.

2) Altering the production process to eliminate or reduce hazardous waste. This may be accomplished by changing processes or equipment, improving operations, or doing in-process recycling.

The major focus of source reduction is industry. The Office of Technology Assessment used the term "waste reduction" and defined it as "[i]n-plant practices that reduce, avoid, or eliminate the generation of hazardous waste so as to reduce risks to health and the environment."⁵⁶ In industry, source reduction techniques range from relatively simple to complex: from installing floating roofs in order to minimize chemical vapor loss from storage tanks, to system-wide modifications of the production process.⁵⁷ Although EPA's new policy focuses on industry, the EPA did mention agriculture as one sector where programs should be developed and implemented to reduce the amount of pollution generated.⁵⁸ This single mention of agriculture is not necessarily a sign that agriculture will in fact receive adequate attention by the EPA.⁵⁹

56. SERIOUS REDUCTION, *supra* note 18, at 2.

57. See generally D. SAROKIN, W. MUIR, C. MILLER, & S. SPERBER, CUTTING CHEMICAL WASTES - WHAT 29 ORGANIC CHEMICAL PLANTS ARE DOING TO REDUCE HAZARDOUS WASTES (1985). Floating roofs at one plant prevented the loss of five million pounds of chemical vapors and saved the company \$200,000 per year. *Id.* at 24, 137. At another plant, a new closed-system manufacturing process reduced certain air emissions by 99.7%. *Id.* at 401-02.

58. 54 Fed. Reg. 3845-46 (1989).

59. The EPA has attempted in recent years to develop a groundwater protection program. See U.S. EPA., AGRICULTURAL CHEMICALS IN GROUND WATER: PROPOSED PESTICIDE STRATEGY (Feb. 1988); U.S. EPA., GROUNDWATER PROTECTION STRATEGY (Aug. 1984). However, commentators have questioned whether EPA's actions will be effective. See, e.g., Sivas, *Groundwater Pollution from Agricultural Activities: Policies for Protection*, 7 STAN. ENVTL. L.J. 117, 134-35 (1988) (EPA has traditionally avoided responsibility for groundwater protection, and without clear direction from Congress, may continue to do so); Lewis & Berry, *EPA's Pesticides in Groundwater Strategy: Will It Work?*, 4 NAT. RESOURCES & ENV'T 16 (1989) (practical, legal, and procedural aspects of EPA's program remain unresolved; the program gives states a critical role and is committed to flexibility); cf. Commoner, *supra* note 1, at 54 ("['T]erm 'regulatory flexibility' is the industrial lobbyist's well-known euphemism for relaxing the enforcement of regulations.").

Nonetheless, the need for source reduction in the agricultural industry is at least as compelling as the need for source reduction in other sectors. It may be even more so, since agricultural wastes are not amenable to end-of-pipe treatment and are not regulated to anywhere near the extent that point source industrial wastes are.⁶⁰ Agricultural wastes are becoming a larger percentage of all wastes, basically due to regulation of industrial wastes.⁶¹ Further, agricultural pollution is capable of canceling out pollution prevention gains in other sectors.⁶² Some writers urge the adoption of modified pesticide or fertilizer use as a solution.⁶³ Regulating the use of farm chemicals as a means to keep them out of the environment, however, is akin to using control devices. As Dr. Commoner stated, such efforts are ultimately self-defeating.⁶⁴

III. Agricultural Pollution

The agricultural industry contributes its share of the growing hazardous waste problem through its reliance on vast quantities of chemical fertilizers and pesticides.⁶⁵ In fact, "[a]griculture is the largest single nonpoint source" of surface water pollution.⁶⁶ Further, "[a]lthough groundwater contamination has many sources, evidence suggests that agricultural

60. Sivas, *supra* note 59, at 117; CONSERVATION FOUNDATION, *supra* note 36, at 189.

61. See V. NOVOTNY & G. CHESTERS, *HANDBOOK OF NONPOINT SOURCE POLLUTION* 2-3 (1981).

62. *Id.*

63. *E.g.*, Sivas, *supra* note 59, at 159-79. Modified use might include implementing practices aimed at reducing the amount of leaching and runoff on a site-by-site basis (best management practices); restrictions on rates, amounts, and frequency of applications; or land use restrictions. *Id.*

64. See Commoner, *supra* note 1.

65. CONSERVATION FOUNDATION, *supra* note 36, at 145. The term "pesticide" generally means any substance used to prevent, destroy, repel, or mitigate any pest or as a plant regulator, defoliant, or desiccant. Federal Insecticide, Fungicide, and Rodenticide Act § 2, 7 U.S.C. § 136(u) (1988). Pesticides encompass herbicides, insecticides, fungicides, nematocides, rodenticides, and acaricides. According to one source, 92% of all pesticide use is by agriculture. *THE LEACHING FIELDS*, *supra* note 38, at 8. The most common fertilizer is nitrogen, followed by phosphorus and potassium. *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 40.

66. *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 89.

activity may be a significant source."⁶⁷

The use of farm chemicals in the United States has grown astronomically since their introduction. Prior to World War II, the use of synthetic chemical pesticides was virtually unknown. Other than the use of certain elemental compounds, such as arsenic or copper, agriculture was essentially nonchemical.⁶⁸ Between 1964 and 1984, agricultural use of pesticides almost tripled.⁶⁹ According to a recent EPA estimate, agriculture used over one billion pounds of pesticide active ingredients in one year.⁷⁰ In California, the Department of Food and Agriculture (CDFA) reported that almost ninety-four million pounds of active ingredient of restricted pesticides were used in 1987.⁷¹ Neither of these figures include the amount of inert ingredients used in the various pesticide formulations.⁷²

Given such immoderate use, it is not surprising that more groundwater is contaminated by pesticides than previously thought. The EPA has confirmed that forty-six pesticides have contaminated the groundwater of twenty-six states as a result of normal agricultural use.⁷³ Only two years earlier, the

67. E. NIELSON & L. LEE, *supra* note 38, at 1.

68. Interview with Ralph Lightstone, Staff Attorney for California Rural Legal Assistance Foundation in Sacramento (Nov. 29, 1989).

69. E. NIELSON & L. LEE, *supra* note 38, at 2. Between the 1940's and the 1970's, crop losses from insect pests doubled despite a tenfold increase in insecticide use. Pimentel, Krummel, Gallahan, Hough, Merrill, Schreiner, Vittum, Koziol, Back, Yen, & Fiance, *Benefits and Costs of Pesticide Use in U.S. Food Production*, 28 *BIO-SCIENCE* 772, 778 (1978).

70. U.S. E.P.A., *PESTICIDE INDUSTRY SALES AND USAGE: 1987 MARKET ESTIMATES* (1988).

71. CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE (CDFA), *PESTICIDE USE REPORT ANNUAL* (1987). This figure is likely to be low as CDFA reported that almost 600 million pounds of active ingredient were sold in California. CDFA, DIVISION OF PEST MANAGEMENT, *REPORT OF PESTICIDES SOLD IN CALIFORNIA FOR 1987 BY POUNDS OF ACTIVE INGREDIENTS* (1988).

72. Inert ingredients may be as hazardous to human health or the environment as the active ingredients in a pesticide formulation. A particular chemical may be an active ingredient in one formulation, but an inert ingredient in another. Interview with Ralph Lightstone, *supra* note 68.

73. *Report Says Regular Use of Pesticides Result in More Contamination Than Believed*, 19 *Env't Rep.* (BNA) 1755-56 (Dec. 23, 1988). The contamination constitutes a threat to human health. For example, alachlor, one of the most widely used herbicides in the nation and one of the most commonly detected pesticides in ground-

EPA had confirmed twenty pesticides in the groundwater in twenty-four states.⁷⁴ Based on their analysis of the same studies, another group concluded that seventy-three pesticides contaminated the groundwater of thirty-four states from normal agricultural use.⁷⁵ In California, which has the dubious distinction of leading the nation in the use of farm chemicals,⁷⁶ fifty-seven pesticides were found in the groundwater as of 1985. Twenty-two of the fifty-seven were known or suspected to be from nonpoint sources, most likely agriculture.⁷⁷ These figures are likely to rise with increased monitoring and the passage of time. Current efforts do not monitor all wells or all pesticides.⁷⁸ Further, because of the slow movement of groundwater, contaminants may not appear in wells until years or even decades after their release at the ground surface.⁷⁹

Fertilizers, especially nitrogen, have also seen increased use over the past forty years.⁸⁰ Between 1960 and 1980, the use of inorganic nitrogen fertilizers quadrupled, primarily as a result of heavier applications, and often overapplications, rather than from an expansion in acreage.⁸¹ Nitrogen fertilizers produce nitrates, a common contaminant of groundwater, which cause serious health and environmental effects.⁸²

water, is classified by the EPA as a probable human carcinogen. *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 83, 105.

74. 19 Env't Rep. (BNA) 1755-56 (Dec. 23, 1988).

75. *Id.*

76. *THE LEACHING FIELDS*, *supra* note 38, at 5-6. Ironically, California has one of the worst groundwater contamination problems in the country despite the fact that it has had one of the most developed pesticide regulatory systems in the United States. Dunning, *Pests, Poisons, and the Living Law: The Control of Pesticides in California's Imperial Valley*, 2 *ECOLOGY L.Q.* 633, 636 (1972).

77. *THE LEACHING FIELDS*, *supra* note 38, at 17.

78. *CONSERVATION FOUNDATION*, *supra* note 36, at 66, 79.

79. *Id.* at 57-58.

80. *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 40.

81. E. NIELSON & L. LEE, *supra* note 38, at 2 (use soared from under 3 million tons in 1960 to over 11 million tons in 1985); *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 42.

82. *CONSERVATION FOUNDATION*, *supra* note 36, at 71. Elevated nitrate levels in drinking water can cause methemoglobinemia, which reduces the blood's oxygen-carrying capacity. This condition has been fatal to infants and may be associated with birth defects. *Id.* at 95. Nitrates also accelerate the process of eutrophication in lakes.

Many commentators agree that the current regulatory system inadequately protects groundwater and that with current agricultural practices, groundwater contamination will inevitably become even more serious.⁸³ Yet despite its capacity for contamination of water resources, agriculture has generally been exempt from regulation.⁸⁴ None of the major federal environmental laws, including the Clean Water Act (CWA)⁸⁵ and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),⁸⁶ have had much effect in preventing farm chemical contamination of groundwater.⁸⁷ Few states have specifically addressed this problem.⁸⁸

A. Clean Water Act

The CWA was designed to protect "the chemical, physical, and biological integrity of the Nation's waters."⁸⁹ As a practical matter, its objective is stated more broadly than its actual reach. The central feature of the CWA is the National Pollution Discharge Elimination System (NPDES). The CWA prohibits the discharge of pollutants into navigable waters of the United States without a permit.⁹⁰ Two aspects of the system prevent it from having an impact on agricultural operations. First, the term "navigable waters" is generally considered to mean surface waters. Some courts have rejected the argument that the CWA gives the EPA authority to regulate

See generally B. COMMONER, *THE CLOSING CIRCLE* 94-111 (1971).

83. Sivas, *supra* note 59, at 118; *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 90.

84. NATIONAL RESEARCH COUNCIL, *INVESTING IN RESEARCH: A PROPOSAL TO STRENGTHEN THE AGRICULTURE, FOOD, AND ENVIRONMENTAL SYSTEM* 53 (1989) [hereinafter *INVESTING IN RESEARCH*].

85. Federal Water Pollution Control Act of 1972, 33 U.S.C. §§ 1251-1387 (1988).

86. Federal Insecticide, Fungicide, and Rodenticide Act §§ 2-31, 7 U.S.C. §§ 136-136y (1988).

87. For a more detailed examination of federal statutes that touch on groundwater issues, see generally Sivas, *supra* note 59, at 135-56.

88. Six states have addressed this problem: Arizona, ARIZ. REV. STAT. ANN. §§ 49-301 to -307 (1988); California, CAL. FOOD & AGRIC. CODE §§ 13,141-13,152 (West 1986); Illinois, ILL. ANN. STAT. ch. 111½, para. 7457 (Smith-Hurd 1988); Iowa, IOWA CODE ANN. §§ 455E.1-.11 (West 1990); South Dakota, S.D. CODIFIED LAWS ANN. §§ 34A-2-103 to 110; Wisconsin, WIS. STAT. ANN. §§ 160.001-.50 (West 1989).

89. CWA § 101(a), 33 U.S.C. § 1251(a).

90. CWA § 301, 33 U.S.C. § 1311.

discharges into groundwater.⁹¹ On the other hand, some courts have suggested that the EPA's regulatory authority might be extended to "discharges to groundwater that has a direct hydrological connection to surface waters."⁹² Second, even if groundwater were included, the NPDES requirement is triggered only when there is a point source discharge. As discussed above, most agricultural chemical waste is of nonpoint source origin. Further, the CWA specifically exempts irrigation return flows and agricultural stormwater discharges from the NPDES requirement.⁹³ The end result is that agricultural chemical discharges are not regulated by NPDES requirements.

Agricultural nonpoint source pollution is supposed to be controlled under the CWA planning provisions.⁹⁴ The CWA directs the states to develop and implement section 208 area-wide waste treatment management plans.⁹⁵ The weakness of this provision lies in the fact that the EPA has authority to approve the plans, but not to compel the states to do them.⁹⁶ Consequently, these plans have not had any significant impact on agricultural nonpoint source pollution.⁹⁷

In 1987, Congress amended the CWA to add a new section dealing with nonpoint source pollution.⁹⁸ Section 319 contains two principal devices to address nonpoint source pollution, state assessment reports and state management programs.⁹⁹ Once again, Congress has deferred to the states to deal with water quality problems. One commentator has criti-

91. See *McClellan Ecological Seepage Situation (MESS) v. Weinberger*, 707 F. Supp. 1182, 1193-96 (E.D. Cal. 1988) (NPDES permits not required for discharges of pollutants to isolated groundwater); *Kelley v. United States*, 618 F. Supp. 1103, 1105-07 (W.D. Mich. 1985) (term "navigable waters" as used in CWA does not include groundwater).

92. *E.g.*, *MESS*, 707 F. Supp. at 1194. *Contra Kelley*, 618 F. Supp. at 1107 (rejecting argument that pollution migrating from groundwater to surface water was within EPA's regulatory jurisdiction).

93. CWA §§ 502(14), 402(I), 33 U.S.C. §§ 1362(14), 1342(I).

94. CWA § 208(b)(2)(F), 33 U.S.C. § 1288(b)(2)(F).

95. CWA § 208(a)-(b), 33 U.S.C. § 1288(a)-(b).

96. See 33 U.S.C. § 1288(a)(7), (b)(3)-(4).

97. Keene, *Managing Agricultural Pollution*, 11 *ECOLOGY L.Q.* 135, 154 (1983).

98. CWA § 319, 33 U.S.C. § 1329.

99. CWA § 319(a)-(b), 33 U.S.C. § 1329(a)-(b).

cized this provision as being redundant and lacking meaningful sanctions if the states fail to comply with the statute.¹⁰⁰ Further, while Congress established a grant program to assist the states in implementing their management programs, Congress appropriated no funds for the program in 1989.¹⁰¹

Sections 208 and 319 both rely on "best management practices" (BMPs) as a tool to deal with nonpoint source pollution. Quite simply, BMPs are "the correct way of doing things on a particular piece of ground."¹⁰² For instance, BMPs may specify pesticide application rates, given the particular site's soil permeability, depth to the water table, and other factors affecting vulnerability to leaching. The BMPs may call for finely-tuned and precisely-adjusted equipment to achieve these rates. The system, however, will not work as well as it is supposed to; there is a disparity between what is scientifically possible on a test plot and what is actually possible in day-to-day field work.¹⁰³

B. FIFRA

Like the CWA, FIFRA has proven ineffective to protect groundwater from pesticide pollution. FIFRA primarily established a system for the classification, registration, and labeling of pesticides.¹⁰⁴ FIFRA provides that a pesticide may be registered for use "when used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment."¹⁰⁵ This simply provides no guarantee of pollution prevention. Indeed, in spite of FIFRA regulation, pesticides have polluted groundwater under normal agricultural practices.

100. Davidson, *Thinking About Nonpoint Sources of Water Pollution and South Dakota Agriculture*, 34 S.D.L. REV. 20, 44 (1989).

101. *Id.* at 42, 45.

102. *Id.* at 46.

103. Interview with Ralph Lightstone, *supra* note 68.

104. See generally FIFRA § 3, 7 U.S.C. § 136a (1988).

105. FIFRA § 3, 7 U.S.C. § 136a(c)(5)(D).

C. Other Federal Laws

A handful of other federal statutes have likewise failed to provide protection for groundwater. These include the Safe Drinking Water Act,¹⁰⁶ the Toxic Substances Control Act,¹⁰⁷ the Resource Conservation and Recovery Act,¹⁰⁸ and the Comprehensive Environmental Response, Compensation, and Liability Act.¹⁰⁹ These statutes have failed either because agricultural pollution does not fall within their ambit or because the EPA has failed to enforce them with respect to these chemicals.¹¹⁰

D. Source Reduction In Agriculture

Despite past regulatory failures, the agricultural industry must not be ignored when it comes to source reduction policy. Source reduction in agriculture is necessary for the reasons explained above. Government policy and direction will play a large part in the extent to which a switch to a nonchemical form of agriculture, or organic agriculture, is adopted.¹¹¹ Although ultimately it is the farmers who will decide when and how to alter their production systems,¹¹² significant numbers will be reluctant to do so until economic incentives change.¹¹³ Organic crop insurance could provide one of these incentives. Instead of leaving it to the states, which may bend to special agricultural interests, the government can stimulate source reduction efforts in agriculture.¹¹⁴

106. Public Health Service Act, 42 U.S.C. §§ 300f-300j-11 (1988).

107. Toxic Substances Control Act, 15 U.S.C. §§ 2601-71 (1988).

108. Solid Waste Disposal Act, 42 U.S.C. §§ 6901-92(k) (1988).

109. Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-75(c) (1988).

110. See generally Sivas, *supra* note 59, at 141-46, 150-54.

111. U.S. DEPARTMENT OF AGRICULTURE, REPORT AND RECOMMENDATIONS ON ORGANIC FARMING 46 (July 1980).

112. "Farmers may be forced to make changes as pesticides become less effective through pest resistance and less available due to public pressure and regulation." CALIFORNIA ACTION NETWORK, REDUCING THE USE OF PESTICIDES IN AGRICULTURE: A FARMER'S PERSPECTIVE 3 (1990).

113. ALTERNATIVE AGRICULTURE, *supra* note 12, at 23.

114. Organic crop insurance is but one move the government can make to stimulate voluntary source reduction efforts in agriculture. The government could also re-

IV. Organic Crop Insurance

Organic agriculture is an alternative agricultural production system that eschews the use of chemical pesticides and fertilizers. It is a "systems approach to farming that is more responsive to natural cycles and biological interactions than conventional [chemical-intensive] farming methods."¹¹⁵ In other words, organic agriculture incorporates the twin aspects of source reduction: it reduces the amount of hazardous waste at its source by altering the crop production process and by eliminating the use of hazardous agricultural chemicals.

Prior to World War II, almost all agricultural production was nonchemical. Today, nonchemical production accounts for less than one percent of the produce grown in this country.¹¹⁶ However, interest in organic agriculture and organic food has grown in recent years. In 1980, only two or three states regulated organic agriculture or food;¹¹⁷ now nearly half of the states either regulate organic food or promote organic agriculture in some other way.¹¹⁸ Further, organic agriculture

move regulatory barriers to alternative agricultural systems, such as federal grading standards, which require routine pesticide spraying to meet cosmetic criteria and "cross-compliance" under the Food Security Act of 1985, which discourages crop rotations (an important part of alternative systems). *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 10-13. As in industry, it is likely that the government will play a greater role in encouraging voluntary source reduction efforts in agriculture; although pesticide bans would be more effective, the government is unlikely to embrace them as a solution. *See, e.g.*, 53 Fed. Reg. 24,630 (1988) (exemplifying EPA's unwillingness to cancel all registrations of a pesticide, despite known health risks).

115. *ALTERNATIVE AGRICULTURE*, *supra* note 12, at 135. For a discussion of organic farming techniques, see M. ALTIERI, *AGROECOLOGY: THE SCIENTIFIC BASIS OF ALTERNATIVE AGRICULTURE* (1987); AMERICAN SOCIETY OF AGRONOMY, CROP SCIENCE SOCIETY OF AMERICA & SOIL SCIENCE SOCIETY OF AMERICA, *ORGANIC FARMING: CURRENT TECHNOLOGY AND ITS ROLE IN A SUSTAINABLE AGRICULTURE* (1984); GIPS, *BREAKING THE PESTICIDE HABIT: ALTERNATIVES TO 12 HAZARDOUS PESTICIDES* (1987) (International Alliance for Sustainable Agriculture publication). For weed management, an organic farmer might use crop rotation, competitive crop mixtures, mulching, or cover crops. For insect pest management, she might manipulate crop planting dates, remove the insects mechanically, or use biological controls or cultural practices. For soil management, she might use green manure or compost. ALTIERI *supra*, at 51-52.

116. Burros, *A Growing Harvest of Organic Produce*, N.Y. Times, Mar. 29, 1989, at C1, col. 1.

117. *Id.*

118. At least 17 states have adopted standards for organic food: Alaska, California, Colorado, Connecticut, Iowa, Maine, Minnesota, Montana, Nebraska, New

is the subject of national debate. Legislation is currently pending in Congress to establish a nationwide standard for organic methods and to provide for crop insurance for "low-input" agricultural systems.¹¹⁹

Any policy debate on organic crop insurance is likely to address the economic feasibility of organic agriculture. The research branch of the conservative National Academy of Sciences (NAS) concluded in 1989 that alternative agriculture, including organic agriculture, is economically viable for the farmer and confers environmental benefits on the nation as well.¹²⁰ The NAS examined several case studies of individual alternative systems, including organic farms. One farming operation in California, primarily certified as organic, with some acreage farmed using integrated pest management (IPM),¹²¹ was able to expand based on earnings and savings without incurring debt. In the absence of detailed accounting data, this expansion was "one of the most reliable indicators of good financial performance."¹²² Dr. Commoner also noted that the net economic returns of large-scale midwestern organic farms were equal to the returns of similar conventional farms.¹²³ Agricultural chemicals constitute a sizeable proportion of production costs.¹²⁴ When these production costs are removed,

Hampshire, North Dakota, Ohio, Oregon, South Dakota, Texas, Washington, and Wisconsin. Kansas and Wyoming considered organic bills in 1989. An additional seven states funded research into alternatives to chemical pesticides, organic food marketing systems, or organic farm inspection: Arkansas, Michigan, Missouri, New York, North Carolina, Vermont, and Virginia. See generally CSPI Report, *supra* note 21.

119. S. 970, 101st Cong., 1st Sess. §§ 131-32, 501-02 (1989).

120. See generally ALTERNATIVE AGRICULTURE, *supra* note 12.

121. IPM is another kind of alternative agriculture system. On a pesticide use continuum, IPM falls somewhere between conventional methods and organic methods. One survey revealed that IPM reduces pesticide use by one-third to two-thirds. Note, *Beyond Pesticides: Encouraging the Use of Integrated Pest Management in California*, 11 U.C. DAVIS L. REV. 301, 313-14 (1978).

122. ALTERNATIVE AGRICULTURE, *supra* note 12, at 334.

123. Commoner, *supra* note 1, at 61.

124. In 1986, the national average total cost of fertilizers and pesticides for corn was 34%; soybeans, 25%; and wheat, 23%. ALTERNATIVE AGRICULTURE, *supra* note 12, at 38. Another study found that pesticides represented 36% of the production costs of cotton in California's San Joaquin Valley and 45% of the production costs of Valencia oranges in Fresno County. THE LEACHING FIELDS, *supra* note 38, at 116.

farmers "are less dependent on bank loans and therefore less vulnerable to bankruptcy."¹²⁵

However, certain barriers have hindered the implementation of source reduction in agriculture. First, the Reagan Administration was resistant, if not hostile, to providing support for nonchemical methods of production. In 1982, former Secretary of Agriculture Block called research into organic agriculture a "dead-end."¹²⁶ Seven years later, however, the NAS has called for a federal initiative to substantially increase funding for research into environmentally sustainable agriculture.¹²⁷ Second, federal policy and programs work against the adoption of alternative systems and have contributed to the perceived inherent clash between agricultural and environmental concerns.¹²⁸ Price support programs encourage the cultivation of marginal lands, which requires excessive use of chemicals and contributes to soil erosion and water pollution.¹²⁹ A farmer who participates in commodity programs may suffer a reduction in deficiency payments by switching from continuous cropping to crop rotations because of the way the program is structured.¹³⁰ However, a change in the agricultural system may well prove beneficial for both the environment and the farmers.

Finally, and perhaps most importantly, growers fear that a switch to nonchemical methods will result in substantial pest damage and crop loss, threatening them with financial disaster.¹³¹ A program of organic crop insurance would remove a barrier to farmers' voluntary conversion. Under current federal law, conventional farmers avail themselves of crop insurance to protect them from uncertainties which could spell financial disaster. Before discussing organic crop insurance, this article will first provide an overview of the existing federal

125. Commoner, *supra* note 1, at 61.

126. Burros, *supra* note 116.

127. See generally INVESTING IN RESEARCH, *supra* note 84.

128. ALTERNATIVE AGRICULTURE, *supra* note 12, at 6.

129. *Id.* at 236.

130. *Id.* at 238-40.

131. Telephone interview with Bob Cantisano, Vice-President, Steering Committee for Sustainable Agriculture (Nov. 13, 1989).

crop insurance program.

A. Existing Federal Crop Insurance Provisions

Crop insurance has been available to farmers since Congress enacted the Federal Crop Insurance Act in 1938.¹³² The purpose of the Act is to "promote the national welfare by improving the economic stability of agriculture."¹³³ The Act created the Federal Crop Insurance Corporation (FCIC) to administer the crop insurance program.¹³⁴ FCIC is empowered to insure against the loss of insured commodities¹³⁵ due to "unavoidable causes," which are primarily weather-related, but may also include insect infestation, plant disease, and "other unavoidable causes as may be determined by" FCIC's board of directors.¹³⁶

A crop insurance policy generally insures yield per acre.¹³⁷ If production falls short of that amount due to unavoidable causes, the farmer will receive an indemnity payment to make up the difference between the guaranteed yield and the actual yield.¹³⁸ However, under existing law, no policy will insure more than 75% of average yield.¹³⁹ The farmer pays a premium which is ultimately based on production history of the county and the individual farmer.¹⁴⁰

The current structure of this program makes it difficult for organic farmers to obtain crop insurance.¹⁴¹ First, an or-

132. Federal Crop Insurance Act §§ 501-520, 7 U.S.C. §§ 1501-20 (1988).

133. *Id.* § 502, 7 U.S.C. § 1502.

134. *Id.* § 503, 7 U.S.C. § 1503.

135. Insurance is not available on all crops. For a listing of the crops for which insurance is available in 1991, see FEDERAL CROP INSURANCE CORP., A GUIDE TO CROP INSURANCE PROTECTION 3 (1991) [hereinafter FCIC]. More crop types are added as actuarial data becomes available.

136. Federal Crop Insurance Act § 508(a), 7 U.S.C. § 1508(a).

137. FCIC, *supra* note 135, at 3. Yield means average historical yield, usually a ten-year average including the farmer's own crop production records. *Id.*

138. *Id.*

139. Federal Crop Insurance Act § 508(a), 7 U.S.C. § 1508(a). For 1989, farmers may insure for 50%, 65%, or 75% of an average yield. FCIC, *supra* note 135, at 3.

140. FCIC, *supra* note 135, at 3.

141. Telephone interview with Bob Cantisano, *supra* note 131. Theoretically, crop insurance is available for organic crops. Telephone interview with Larry Dell, Director of Field Underwriting, FCIC Sacramento Office (Dec. 21, 1989). However, it

ganic crop loss may not be considered an unavoidable loss. On an organic farm, some losses might have been avoided or mitigated had chemicals been used. Further, insurance will not cover losses due to the "failure of the producer to follow good farming practices."¹⁴² FCIC looks to the practices normal for an area to determine whether a farmer followed the correct practices.¹⁴³ Conventional thinking almost always assumes this involves the use of farm chemicals. Thus, an organic farmer can be denied crop insurance payments even after following good nonchemical farm practices. Second, the insurance policy excludes insect damage on certain crops, generally fruit, vegetable, and specialty crops, that organic farmers often grow.¹⁴⁴ Third, production histories have not been developed for organic crops.¹⁴⁵

B. *The Concept of Organic Crop Insurance*

"Organic crop insurance" is an idea that has just recently gained a national forum. Senator Wyche Fowler introduced a bill in Congress that would enact the "Farm Conservation and Water Protection Act of 1989."¹⁴⁶ This bill would make changes to the existing crop insurance provisions for the benefit of alternative agricultural systems.¹⁴⁷ It would prohibit the FCIC's board of directors from refusing crop insurance or raising premiums based solely on whether a grower utilized an

seems counterintuitive that a bill would be pending in Congress to prevent FCIC from denying crop insurance to organic growers if these growers were actually obtaining coverage. See *infra* text accompanying notes 146-49.

142. Federal Crop Insurance Act § 508(a), 7 U.S.C. § 1508(a) (1988).

143. Telephone interview with Larry Dell, *supra* note 141.

144. FCIC, *supra* note 135, at 3; telephone interview with Larry Dell, *supra* note 141.

145. FCIC, *supra* note 135, at 3.

146. S. 970, 101st Cong., 1st Sess. (1989).

147. The bill uses the term "low-input agricultural production system" and defines it as an "agricultural production system and management strategy, designed for a family-sized farm, that optimizes on-farm resources and minimizes production items and practices with known or potentially adverse impacts on human health and the environment, while maintaining an acceptable level of production and profit from farming." S. 970, § 103(2). This article does not argue that organic crop insurance should be limited to family-farms; on the contrary, extending its availability to large-scale farming operations would offer the greatest benefit.

alternative agricultural system.¹⁴⁸ In addition, the bill would direct the board to submit a report describing crop insurance needs of growers using or converting to alternative agricultural systems and recommending changes to the Federal Crop Insurance Program to meet those needs.¹⁴⁹

Organic crop insurance would provide several benefits. First, and most importantly, it would facilitate the conversion from a chemical-intensive method of production of food and fiber to a nonchemical method of production. Organic crop insurance would protect farmers from suffering crop losses that might have been otherwise mitigated had they used agricultural chemicals. This very possibility has deterred some farmers from switching.¹⁵⁰ Second, it could play a major role in protecting the environment. The use of fewer farm chemicals means that fewer farm chemicals escape into the environment. As an additional benefit, a corresponding reduction in industrial wastes from decreased pesticide production can be expected to accompany decreased pesticide use. Third, it could help to wean farmers from federal subsidies. One report stated that "[f]armers who adopt alternative farming systems often have productive and profitable operations, even though these farms usually function with relatively little help from commodity income and price support programs or extension."¹⁵¹ The important thing is to provide farmers with a positive incentive, encouraging them to switch to nonchemical agriculture. In light of the above considerations, this article proposes a two-tier organic crop insurance program.

C. *Organic Crop Insurance Proposal*

Organic crop insurance is absolutely essential during the initial period of transition from a chemical to a nonchemical production system. Substantial crop losses caused by pests normally occur during the first few seasons after a farmer dis-

148. S. 970, 101st Cong., 1st Sess. § 131 (1989).

149. S. 970, 101st Cong., 1st Sess. § 132 (1989).

150. Telephone interview with Bob Cantisano, *supra* note 131.

151. ALTERNATIVE AGRICULTURE, *supra* note 12, at 8.

continues pesticide use.¹⁵² During this time, the ecosystem, rendered sterile from farm chemicals, is devoid of natural predators and other biota and naturally-occurring soil fertility which are integral to an organic system.¹⁵³ Thus, withdrawal of farm chemicals can adversely affect economic performance during the transition. Once the ecosystem reestablishes equilibrium,¹⁵⁴ however, the farmer can deal with the pest problem using appropriate organic techniques. Also, farmers may need time to gain experience in running an alternative agricultural system.¹⁵⁵

Ideally, crop insurance would provide one hundred percent coverage - a form of indemnification - for crop losses that would have been avoided or mitigated with the use of pesticides during the transitional period. One hundred percent transitional insurance would provide the greatest incentive, and consequently, would most likely achieve the greatest participation. The period of transition, during which time the farmer would be entitled to complete indemnification, should be limited in duration, from at least three to perhaps five years. IPM farmers would not be eligible for transitional insurance because they do resort to pesticides to deal with pests.¹⁵⁶ Thus, the corresponding benefit to the nation is smaller. Congress would have to exempt this tier of insurance protection from the seventy-five percent limitation of coverage.

Critics of farm subsidies are likely to oppose another subsidy for agriculture. However, it has now been recognized that agriculture is causing serious environmental problems.¹⁵⁷ Spending funds for organic crop insurance may offset funds spent on groundwater monitoring and cleanup. It may also help wean farmers from other subsidies.¹⁵⁸ In sum, the entire

152. Telephone interview with Bob Cantisano, *supra* note 131.

153. ALTERNATIVE AGRICULTURE, *supra* note 12, at 199.

154. The ecosystem will not establish equilibrium until all chemicals are eliminated. Telephone interview with Bob Cantisano, *supra* note 131.

155. ALTERNATIVE AGRICULTURE, *supra* note 12, at 199.

156. Note, *supra* note 121, at 313-14.

157. ALTERNATIVE AGRICULTURE, *supra* note 12, at 89.

158. See *supra* text accompanying note 151.

nation will reap the benefit. Further, Congress intended to expand the coverage of Federal Crop Insurance Act.¹⁵⁹ The original Federal Crop Insurance Act contemplated coverage only for wheat crops, and now covers forty-five crops.¹⁶⁰ It is also FCIC's policy to encourage broad participation among farmers.¹⁶¹ Finally, industry has not traditionally been subsidized like agriculture. One reason may be that the variables affecting production are more controllable in a factory than on a field.

After the transition period, farmers should be able to obtain crop insurance for a reasonable premium. As the Fowler bill states, legislation should prohibit insurers from refusing to insure organic farmers, as well as those that use other alternative systems.¹⁶² The insurance would specifically cover crop loss due to pests that would have been avoided or mitigated by chemical use. Regular crop insurance generally does not cover this type of loss. The premiums should be based on risk factors just as is done for conventional crops. However, when an area is classified as uninsurable based on severe loss experience of conventional farmers, this would not preclude coverage of organic farmers. The production history of organic farms should include post transition history only for insurance purposes.¹⁶³

Growers need not be certified as organic when they begin the transition. However, they would have to adopt a complete system of organic production, and not just eliminate the chemicals. Under current law, crop insurance does not cover the "losses due to the neglect or malfeasance of the producer . . . or to the failure of the producer to follow good farming practices."¹⁶⁴ This provision would apply to organic farmers. Like conventional farmers, organic farmers would have to

159. *Hearings on S. 1397 Before a Special Subcomm. of the House Comm. on Agriculture*, 75th Cong., 1st. Sess. 41 (1937) (statement of Sen. James P. Pope).

160. FCIC, *supra* note 135, at 2.

161. Federal Crop Insurance Act § 508(b)(3) (1988). 7 U.S.C. § 1508(b)(3); *see generally* FCIC, *supra* note 135.

162. *See supra* note 148 and accompanying text.

163. *See supra* note 145 and accompanying text.

164. Federal Crop Insurance Act § 508(a), 7 U.S.C. § 1508(a).

keep production records.¹⁶⁵ They would need to follow certain guidelines to be eligible to collect insurance payments. In sum, with just a few changes, organic farmers could be incorporated into the existing federal crop insurance structure.

V. Conclusion

Dr. Commoner astutely observed that the only sure way to prevent pollutants from entering the environment and our bodies is to eliminate the pollutant from the production process. This holds true for agriculture as well as industry. Because of the pollution agricultural chemicals are causing, the government should incorporate agriculture into its source reduction efforts. Providing organic crop insurance is one move the government can make to create a voluntary incentive for farmers to convert to a more environmentally-sound system of agricultural production.

165. FCIC, *supra* note 135, at 5.