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Efforts to Prevent Misuse of Pesticides Exported to Developing Countries: Progressing Beyond Regulation and Notification

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INTRODUCTION

Misuse of pesticides produced and exported by developed countries creates significant adverse health and environmental effects in less developed countries (LDCs). Both individual countries and international organizations have attempted to remedy this important problem. This Comment examines the nature of the problem of misuse of pesticides, analyzes unilateral United States efforts to solve it, and concludes by examining international attempts to regulate the export trade in pesticides. The concluding section also assesses the potential of other effective vehicles for environmental regulation.

I
PROBLEMS OF PESTICIDE USE IN LDCS

Many less developed countries, dependent upon agriculture for both domestic consumption and export income, find themselves at the mercy of agricultural pests. In addition, malaria and other pest-borne diseases are among the major causes of death in many LDCs.[1] Although the need for pesticides is significant, the synthetic pesticides used to control these problems—largely manufactured and exported by major industrialized nations—are extremely hazardous.[2]

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1. D. BULL, A GROWING PROBLEM: PESTICIDES AND THE THIRD WORLD POOR 28 (1982).

2. Hayes & Vaughn, *Mortality from Pesticides in the U.S. in 1973 and 1974*, 42 TOXICOLOGY & APPLIED PHARMACOLOGY 235 (1977); Hayes & Pirkle, *Mortality from Pesticides in 1961*, 12 ARCHIVES ENVTL. HEALTH 43 (1966); Hayes, *Mortality in 1969 from Pesticides, Including Aerosols*, 31 ARCHIVES ENVTL. HEALTH 61 (1976).

A. Dangers Associated with Pesticide Use

1. Human Poisoning

The most serious problem associated with the use of pesticides in both developed and less developed countries is direct human poisoning. Pesticide poisoning occurs in several ways: the toxic chemical may be ingested, inhaled, or absorbed through the skin.[3] In a 1972 study, the World Health Organization's Expert Committee on Insecticides "conservatively" estimated that approximately 500,000 people are accidentally poisoned by pesticides each year.[4] The study estimated that one percent of these poisonings were fatal in countries "where medical treatment and antidotes are readily available," but that the rate of death was likely to be higher in LDCs.[5] In less developed countries, where agriculture may form the basis of the economy, people may be poisoned while working in fields, in formulation plants, or in anti-malaria programs. An estimated forty percent of accidental poisonings are occupationally related.[6]

Different pesticides cause different adverse health reactions in the human body. Some agents cause dizziness, nausea, vomiting, and other temporary symptoms.[7] Others cause more permanent harm, such as nerve damage,[8] sterility,[9] or blood,[10] liver,[11] and other diseases. Some pesticides may cause such severe health problems as genetic changes and birth defects[12] or cancer.[13] A few pesticides can be immediately fatal.[14]

The incidence of human poisoning from pesticides may be as much as thirteen times higher in LDCs than in the United States.[15] The actual extent of the problem is unclear because limited medical resources hamper the collection of statistics on human poisoning. Moreover, when figures do become available, they frequently go unheeded unless the problem also affects people in developed nations.[16]

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3. D. BULL, *supra* note 1, at 38.
4. *Id.* at 37.
5. *Id.*
6. *Id.* at 38.
7. Wyrick, *U.S.-Made Poisons Hurt More Than Just Pests*, Newsday, Dec. 14, 1981, at 20, col. 1.
8. *Id.*
9. PILLS, PESTICIDES, AND PROFITS 28 (R. Norris ed. 1982).
10. D. WEIR & M. SHAPIRO, CIRCLE OF POISON 12 (1981).
11. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 13.
12. D. BULL, *supra* note 1, at 38.
13. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 20.
14. *Id.*
15. D. WEIR & M. SHAPIRO, *supra* note 10, at 11. A World Health Organization report on occupational health in 1976 noted that in some countries, field surveys of poisoning among "spraymen" exposed to agricultural chemicals revealed that nearly 40% of field workers had symptoms of poisoning during spraying periods. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 16.
16. For example, leptophos, a pesticide produced in the United States and exported to

2. *Environmental Damage*

Direct human poisoning is only one of the dangers of pesticide use. The toxic effects of pesticides are felt throughout the environment. Improperly used or disposed of pesticides that enter the waterways through runoff can cause massive fish kills.[17] Birds, wild animals, and domestic livestock also ingest pesticides by eating smaller animals or vegetation in which toxic chemicals persist. The poison moves up the food chain in this manner and is often eventually ingested by humans.[18]

Another environmental side effect associated with the use of chemical pesticides is that certain insect populations develop resistance to pesticides.[19] For example, in some areas, the mosquito that carries malaria has developed resistance to DDT; this explains the increase in malaria outbreaks in countries where experts once believed the disease had been eradicated.[20] An insect species may also develop resistance to pesticides employed to control a completely different pest. This problem occurred recently in Central America and India, where a resurgence of malaria followed an increase in agricultural rather than anti-malarial use of pesticides.[21] Furthermore, some species may develop "cross-resistance" (resistance to chemically related pesticides) and "multiple-resistance" (resistance to a broad range of unrelated pesticides).[22] In some cases, a pesticide can also alter the genetic make-up of certain pests, creating a "super-pest" which is more destructive than the original insect.[23]

3. *The Economic Treadmill*

Dependence on pesticides can create serious economic problems in

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developing nations from 1971 to 1976 under the trade name Phosvel, was blamed for the deaths of several farmers and hundreds of water buffalo in Egypt in 1971. United States production of leptophos was finally discontinued in 1976 when workers at the Texas plants manufacturing the pesticide began to show symptoms of severe nerve damage, partial paralysis, impaired vision, and dizziness. Several of the workers were diagnosed as having multiple sclerosis, psychiatric disorders, and encephalitis. The epidemic was so widely publicized that the victims became known as the "phosvel zombies." PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 15-16; *see also* Alpern, *The 'Phosvel Zombies,'* NEWSWEEK, Dec. 13, 1976, at 38.

17. Metcalf, *Changing Role of Insecticides in Crop Protection*, 25 ANN. REV. ENTOMOLOGY 219, 239-40 (1980).

18. *Id.* at 238; *see also* PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 20-21; D. BULL, *supra* note 1, at 54-56.

19. J. PERKINS, INSECTS, EXPERTS, AND THE INSECTICIDE CRISIS: THE QUEST FOR NEW PEST MANAGEMENT STRATEGIES 34-37 (1982); PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 20-25.

20. R. VAN DEN BOSCH, THE PESTICIDE CONSPIRACY 31 (1976); PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 22-25; Chapin & Wasserstrom, *Agricultural Production and Malaria Resurgence in Central America and India*, 293 NATURE 181 (1981); Luck, van den Bosch & Garcia, *Chemical Insect Control—A Troubled Pest Management Strategy*, 27 BIOSCIENCE 606, 608-09 (1977).

21. Chapin & Wasserstrom, *supra* note 20, at 181.

22. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 24.

23. *Id.* at 19-25.

developing countries. For the governments of some poorer nations, expenditures for pesticides, even for an important program such as malaria prevention, may be just one more unwelcome strain on an overburdened budget.[24] Devastating economic problems can result from the overuse of pesticides on cash crops when the evolution of chemical-resistant insect strains leads to declining yields and requires the use of increasingly toxic pesticides.[25]

This pesticide "treadmill" may not be an accidental tragedy but, instead, may actually be fostered by the companies that produce and export pesticides. These companies, typically multinationals based in developed countries, can "play on the apprehensions of growers and governments, bombarding them with advertisements and 'free' technical advice."[26] Information on pesticide use is often available only from pesticide dealers who may lack an adequate technical background, or from radio programs sponsored by chemical manufacturers.[27] International agencies such as the United Nations Food and Agriculture Organization (FAO) and the United States Agency for International Development (USAID) have been accused of being "co-opted" by these pesticide companies, so that the only place developing countries can get information or financial assistance is from those interested in promoting the use of chemical pesticides.[28]

4. The Boomerang Effect

The misuse of pesticides has global as well as local effects. Pesticides can haunt the countries that manufacture and export them in the form of residues on agricultural products. This "boomerang effect" can occur even in those countries which ban the domestic use of the pesticides they manufacture.[29] Over seven percent of agricultural imports to

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24. *See* R. VAN DEN BOSCH, *supra* note 20, at 31.

25. One result of this pattern has been insecticide-induced breakdown of cotton ecosystems in Egypt, South and Central America, and Mexico, as well as in Australia, California, and Texas. An example of one such breakdown occurred in the Cañete Valley of Peru, where major cotton production began in the 1920's. Insect pests were originally controlled using biological pesticides such as calcium arsenate and nicotine sulphate. In the 1940's, synthetic chemical pesticides invaded the international market. The modern insecticides were extremely effective at first, and dramatic increases in yields were recorded. But, by 1952, several pest species had developed resistances to the organochloride insecticides, such as DDT, being used by the cotton farmers. The original pests could not be controlled, and secondary pests became a serious problem. The growers switched to the more toxic organophosphates, such as parathion, increased dosages, and shortened treatment intervals, but by the 1955-56 growing season the pests became resistant to this pesticide as well. The cotton crop that season was one of the lowest ever recorded for the valley. *Id.* at 39-41.

26. *Id.* at 38-39.

27. L. CALTAGIRONE, USE OF PESTICIDES BY SMALL FARMERS IN BOLIVIA 10 (1979) (available from the Center for Biological Control, University of California, Berkeley).

28. D. WEIR & M. SHAPIRO, *supra* note 10, at 54-55.

29. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 25-26; *see also* Brownstein, *Big*

the United States originate in Central American countries where pesticides banned or restricted in this country often contaminate food, feed, water, and wildlife.[30] The United States Department of Agriculture has sometimes refused incoming shipments of products with high pesticide residues from these countries.[31]

Some contaminated products can eventually reach developed countries by extremely circuitous routes. For example, in Colombia in the late 1960's, teak trees harvested for lumber became contaminated by the pesticide dieldrin. When the teak wood shavings were sent to Canada for cow litter, the cows ingested some of the shavings, resulting in unacceptably high levels of dieldrin in their milk.[32] An even more unusual case occurred when pesticides applied in West Africa were blown back toward the United States by the Atlantic trade winds.[33]

B. The Need for Pesticides

The significant problems resulting from pesticide use do not necessarily mean that pesticides should never be used in developing countries. Without some form of pest control, these argriculturally-based economies would be at the mercy of insects, nematodes, fungi, weeds, and rodents. Pesticides are also needed for health reasons; the chemical pesticides used to control malaria have no satisfactory replacements.[34] Despite the need for pesticides in LDCs, the current extent of pesticide dependency in developing nations is counterproductive. Researchers calculate that the use of pesticides, particularly parathion in Central America, is forty percent higher than necessary to achieve optimal profits.[35] Even in the United States, studies indicate that farmers could cut insecticide use by thirty-five to fifty percent without affecting crop production, simply by treating fields only when necessary, rather than according to a pre-set schedule.[36]

The argument that pesticides help "feed a hungry Third World" is not persuasive. Pesticides are applied more heavily on cash crops exported to developed countries than on food staples consumed within LDCs.[37] The growth rate of these export crops exceeds that of food crops in many of these LDCs, indicating that pesticides are being used

Business Takes Out the Garbage, STUDENT LAW., April 1981, at 16, 39; Comment, *Controlling the Environmental Hazards of International Development*, 5 ECOLOGY L.Q. 321, 353 (1976).

30. Brownstein, *supra* note 29, at 39.

31. *Id.*

32. Comment, *supra* note 29, at 353.

33. *Id.*

34. Luck, van den Bosch & Garcia, *supra* note 20, at 609.

35. D. WEIR & M. SHAPIRO, *supra* note 10, at 6.

36. *Id.*

37. *Id.* at 36. *See also* L. CALTAGIRONE, M. ALLEN, W. KAISER & J. ORSENIGO, THE CROP PROTECTION SITUATION IN GUATEMALA, HONDURAS, NICARAGUA, COSTA RICA, PANAMA AND GUYANA: A MULTIDISCIPLINARY STUDY TEAM REPORT 13-14 (1972) (avail-

not to increase the yield of food crops needed to feed local populations but rather to supply food and other agricultural products to the developed countries which can afford to import them.[38]

C. Pesticide Use in LDCs

1. Pesticide Regulation

The United States recognizes that pesticides are hazardous substances and regulates their manufacture, packaging, labeling, distribution, use, and disposal.[39] In many less developed countries, such regulation is either nonexistent or insufficient.[40] Governments of many LDCs are simply not capable of enforcing existing laws or even of distributing adequate information.[41] The entire staff of a ministry of agriculture in a developing country may consist of only one or two people with "nothing but a motorcycle and no fuel."[42] Chemical industry representatives often have far superior communication and transportation capabilities.[43]

2. Economic Limitations and Information Problems

Unenforceable legislation is not the only reason pesticides present a greater health and environmental risk in LDCs than in developed countries. Residents of LDCs often lack the knowledge or the economic means to use pesticides properly or to evaluate alternatives to pesticide use. Concern for the long-term environmental implications of pesticide use in such countries may be a lower priority than the more immediate agricultural and economic gains promised by their use.[44] As a result, problems arise in LDCs which would be inconceivable in the United States. For example, quality control in pesticide production in developing countries is virtually nonexistent.[45] Worker safety is also a low priority. Many workers are illiterate in their native language, and very few can read the foreign language (such as English) in which labels and

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able from the Center for Biological Control, University of California, Berkeley) [hereinafter cited as CROP PROTECTION SITUATION].

38. CROP PROTECTION SITUATION, *supra* note 37, at 13-14.

39. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. § 136(a)-(y) (1982).

40. CROP PROTECTION SITUATION, *supra* note 37, at 15; L. CALTAGIRONE, *supra* note 27, at 5, 8-10.

41. L. CALTAGIRONE, *supra* note 27, at 5, 8-10.

42. Interview with Leonardo Caltagirone, Professor of Entomology at the Center for Biological Control, University of California, Berkeley, and Advisor to USAID in Central America (May 11, 1984).

43. *Id.*

44. Note, *Exportation of Hazardous Products*, 7 SYRACUSE J. INT'L L. & COM. 269, 275-76 (1979-80).

45. Pesticides are often adulterated with talcum powder or other cheap extenders to increase profit at each level of distribution. L. CALTAGIRONE, *supra* note 27, at 10-14.

warnings are often printed.[46] Workers may not be warned when crop dusters are about to spray a field, and their only protection may be to run for shelter to avoid poisoning.[47]

3. *Agricultural Development*

Even well-intentioned efforts to increase food production for domestic consumption in LDCs have increased pesticide misuse and dependency. The large-scale introduction of irrigation often involves new crops and new methods of cultivation which attract new pests.[48] Moreover, agricultural development is often characterized by the introduction of new grain varieties which are high-yielding and disease-resistant,[49] but which nonetheless have serious drawbacks. In addition to requiring heavy application of fertilizers, these hybrid strains lack natural resistance to local insects and require more pesticides than the old grains.[50] Small farmers in developing countries can become dependent on synthetic chemical pesticides when they do not have sufficient information about the pests, the hazards of the pesticides they use, or alternative control methods.[51] Furthermore, the availability of a large number of synthetic pesticides simultaneously makes them convenient and creates the impression that these pesticides are the best (or the only) solution to pest problems.[52]

II

UNITED STATES EFFORST TO REGULATE PESTICIDE EXPORTS

A. The Double Standard of Regulation

Concern over the hazards presented by toxic pesticides first became a popular issue in the United States after Rachel Carson published *Silent Spring* in 1962.[53] Although her book encountered criticism in some scientific, political, and administrative circles,[54] it served as a catalyst for important new studies of the environmental problems of pesticide use and as a further impetus for ongoing studies by the National Academy of Sciences,[55] President Kennedy's Science Advisory Committee,[56] and the

46. D. WEIR & M. SHAPIRO, *supra* note 10, at 15-17.
47. Wyrick, *supra* note 7, at 7.
48. Comment, *supra* note 29, at 327.
49. *Id.* at 328.
50. *Id.* at 328-29.
51. D. WEIR & M. SHAPIRO, *supra* note 10, at 7.
52. L. CALTAGIRONE, *supra* note 27, at 5.
53. Ehrlich, *Preface* to R. VAN DEN BOSCH, *supra* note 20, at vii.
54. J. PERKINS, *supra* note 19, at 33.
55. *Id.*; *see* Committee on Pest Control and Wildlife Relationships Publications 920-A, 920-B & 920-C (1962-1963) (available from the National Academy of Sciences, Washington, D.C.).
56. J. PERKINS, *supra* note 19, at 33; *see* PRESIDENT'S SCIENCE ADVISORY COMMITTEE, USE OF PESTICIDES (1963).

United States Senate.[57] Carson's book moved the science of chemical pesticides out of its "era of optimism," when entomologists generally assumed that the benefits of pesticide use outweighed attendant risks, into the "era of doubt" when such assumptions were suspect.[58]

In the following twenty years, the United States Congress enacted major legislation to regulate the domestic production and use of a broad range of hazardous substances, including pesticides.[59] Although LDCs had previously provided only limited markets for United States products, exports of these hazardous products to developing countries increased in tandem with the growth of domestic regulation.[60] From 1974 until 1978, spending by less developed countries on pesticides increased from $641 million to almost one billion dollars.[61]

Not until 1977 did the problems of export of hazardous substances to developing countries capture the attention of the American public the way *Silent Spring* had focused attention on pesticide problems in the United States fifteen years earlier. In October 1977, the press reported that children's sleepwear treated with TRIS, a carcinogenic flame retardant banned in the United States, was being sold in Africa, Asia, and South America.[62] The regulatory double standard of declaring a product too dangerous for domestic consumption, yet selling it to unsuspecting foreign markets, shocked the public and American legislators.[63]

The same double standard also applied to the export of pesticides. The most common argument for this unequal treatment was that conditions in developing countries, such as rampant unemployment, over-

57. J. PERKINS, *supra* note 19, at 33.

58. *See* Metcalf, *supra* note 17, at 220-21.

59. *See* Federal Insecticide, Fungicide, and Rodenticide Act of 1972, Pub. L. No. 92-516, § 2, 86 Stat. 975 (codified as amended at 7 U.S.C. § 136(a)-(y) (1982)); Federal Hazardous Substances Act of 1966, Pub. L. No. 89-756, §§ 2(a)-(c), 3(a), 80 Stat. 1303, 1304 (codified as amended at 15 U.S.C. §§ 1261-1276 (1982)); Consumer Product Safety Act of 1972, Pub. L. No. 92-573, 86 Stat. 1207 (codified as amended at 15 U.S.C. §§ 2051-2083 (1982)); Toxic Substances Control Act of 1976, Pub. L. No. 94-469, 90 Stat. 2003 (codified at 15 U.S.C. §§ 2601-2629 (1982)); Resource Conservation and Recovery Act of 1976, Pub. L. No. 94-580, 90 Stat. 2812 (codified at 42 U.S.C. §§ 6901-6987 (1982)); Comprehensive Environmental Response, Compensation and Liability Act of 1980, Pub. L. No. 96-510, 94 Stat. 2767 (codified at 42 U.S.C. §§ 9601-9657 (1982)). These acts mandated several federal agencies to test, register, and regulate a variety of products. By 1978, the Environmental Protection Agency, the Consumer Product Safety Commission, and the Food and Drug Administration had reportedly removed over 500 pesticides, drugs, consumer products, food additives, chemicals, medical devices, and other goods from the domestic market. HOUSE COMM. ON GOV'T OPERATIONS, REPORT ON EXPORT OF PRODUCTS BANNED BY U.S. REGULATORY AGENCIES, H.R. REP. NO. 1686, 95th Cong., 2d Sess. 13-14 (1978) [hereinafter cited as 1978 HOUSE REPORT].

60. Comment, *United States Export of Banned Products: Legal and Moral Implications*, 10 DEN. J. INT'L L. & POL'Y 537, 539 (1981).

61. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 7.

62. 1978 HOUSE REPORT, *supra* note 59, at 2; Comment, *supra* note 60, at 539; Washington Post, May 6, 1978, at D10, col. 1.

63. Comment, *supra* note 60, at 539; Comment, *U.S. Exports of Products Banned for Domestic Use*, 20 HARV. INT'L L.J. 331 (1979).

population, and epidemics of insect-borne disease, made United States standards of health and safety inappropriate.[64] Poor countries often look with suspicion at the environmental movement in this country; some view the imposition of American standards as a paternalistic act, a sort of "eco-imperialism." As one expert stated: "to them, pollution is a 'rich man's disease' which they would like to contract."[65]

Even given these arguments, the inappropriateness of applying America's domestic standards does not mean that there should be *no* standards regulating the export of pesticides. Developing nations cannot make their own cost-benefit analyses of pesticide use without information on the effects of those pesticides. While this information is widely available in industrial societies, it may not be as readily available to the governments of developing nations, and it is almost completely inaccessible to farmers, health workers, and other individuals who actually use these chemicals and who most need the information.[66]

B. Notification Requirements

An obvious solution to this combined lack of information and aversion to imposed standards is to provide developing countries with enough information so they can make their own decisions, based on their own economic and environmental values. Such a solution is patterned after the notion of "informed consent" required in many other regulatory settings to ensure autonomous, rational decisionmaking.

The exchange of information on pesticides exports has two goals: to educate LDCs about the nature and dangers of the pesticides themselves, and to apprise importing countries of regulations imposed on these pesticides within the exporting country. Theoretically, when both of these goals are met, developing countries can evaluate their own needs, assess the potential risks associated with particular pesticides, and compare their concerns and standards with those of the developed countries, to arrive at the best regulatory decision. Not surprisingly, a 1978 report by the Subcommittee on Commerce, Consumer, and Monetary Affairs of the House Government Operations Committee noted that "approximately 68 percent of foreign countries surveyed indicated interest in receiving notification of U.S. regulatory action."[67] The Subcommittee hearings disclosed, however, that although notification procedures already existed for pesticide exports under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA),[68] they were not being adequately implemented by the United States Environmental Protection Agency

64. Comment, *supra* note 60, at 539.
65. Interview with Leonardo Caltagirone, *supra* note 42.
66. D. BULL, *supra* note 1, at 79-80.
67. 1978 HOUSE REPORT, *supra* note 59, at 4.
68. 7 U.S.C. § 136(a)-(y).

(EPA).[69] Furthermore, even when EPA carried out its duty, the information rarely went further than the United States embassy overseas.[70] The Subcommittee recommended that procedures be established "to assure that only essential and reasonable exports of (hazardous) products are allowed."[71] The Subcommittee further proposed that an export policy be incorporated into the statutes regulating hazardous substances within the United States.[72]

Congress responded to the 1978 Subcommittee Report by amending several relevant statutes. The new provisions required that the commercial importer, or the government of the importing country, or both, be notified of the export of hazardous substances.[73] Congress also strengthened the notification provisions in FIFRA by requiring that exporters, before shipping a domestically-banned pesticide overseas, obtain a statement from the foreign purchaser acknowledging that the pesticide cannot be sold or used in the United States. The exporter must submit a copy of this acknowledgement statement to EPA, which in turn must send it to the appropriate government official in the importing country.[74] The 1978 FIFRA amendments also established new tougher labeling requirements for exported pesticides.[75] Labels for pesticides shipped overseas must now meet most of the requirements applied to pesticides sold in the United States.[76]

Even this effort can be criticized as not going far enough. Obtaining

69. *U.S. Export of Banned Products: Hearings Before the Subcomm. on Commerce, Consumer and Monetary Affairs of the House Comm. on Gov't Operations*, 95th Cong., 2d Sess. 78 (1978) (statement of Henry Eschwege, Director, Community and Economic Development Division, General Accounting Office) [hereinafter cited as *1978 Hearings*]. These hearings provided the source of the information presented in the 1978 HOUSE REPORT, *supra* note 59, at 2-3. FIFRA gave the Environmental Protection Agency authority over domestic pesticide registration and the duty to notify the State Department of any regulatory action taken with respect to an exported pesticide. 7 U.S.C. §§ 136(a), 136(o). The House Subcommittee's hearings disclosed, however, that EPA often failed to notify the State Department of its actions. *1978 Hearings*, *supra*, at 78.

70. *1978 Hearings*, *supra* note 69, at 78.

71. 1978 HOUSE REPORT, *supra* note 59, at 3.

72. *Id.*

73. *See* Consumer Product Safety Act, Pub. L. No. 95-631 § 6(a), 92 Stat. 3746 (codified at 15 U.S.C. § 2067 (1978)); Flammable Fabrics Act, Pub. L. No. 95-631 § 8(a), 92 Stat. 3746 (codified at 15 U.S.C. § 1202 (1978)); and Federal Hazardous Substances Act, Pub. L. No. 95-631 § 7(c), 92 Stat. 3746 (codified at 15 U.S.C. § 1273(d) (1978)).

74. 7 U.S.C. § 136(o).

75. *Id.*

76. These requirements include: (1) false or misleading representations on the label are prohibited; (2) the label must bear the registration number of the producer, along with the producer's name, and the net weight or measure of the contents of the container; (3) the label must contain a statement of the use classification (*e.g.*, "general use" or "restricted use") under which the pesticide is registered; (4) if the pesticide is *not* registered in the United States, the label must bear a conspicuous statement to that effect; (5) the label must contain a statement of ingredients; (6) the label must contain necessary warning or caution statements, and, if the pesticide is highly toxic, the label must bear a skull and crossbones symbol and the word "poison" in red, along with information about antidotes; and (7) the statements on the pesti-

"informed consent" from the purchaser or foreign government does not ensure that workers who actually handle the pesticides will be informed or able to give their consent,[77] or that the foreign governments themselves will act on the information in the export notices.[78] Despite these defects, the information had a significant impact in some LDCs: several countries, including Mexico and South Korea, stopped importing several dangerous substances from the United States in response to export notifications.[79]

C. *Executive Action*

While Congress was enacting tighter export controls, the Carter Administration began its own investigation of the hazardous export problem. The Administration formed an inter-agency working group which proposed for public comment in August of 1980 a United States Hazardous Export Policy.[80] President Carter accepted the recommendation of the working group and, five days before leaving office in January of 1981, he issued Executive Order Number 12,264 which established a United States Hazardous Substances Export Policy.[81] The Order strengthened export notice requirements already required by statute and established formal export licensing controls for "extremely hazardous substances."[82]

One month later, on February 17, 1981, President Reagan revoked the Carter Executive Order and substitued his own, entitled "Federal Exports and Excessive Regulation."[83] The purpose of the Reagan Executive Order, which directed the Departments of State and Commerce to review United States policy on hazardous exports, was to "find ways to accomplish the same goals at a lower cost."[84] Environmental groups strongly criticized this change in policy:

With a single sentence, the Reagan administration wiped out two-and-

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cide's label must be conspicuous and in terms likely to be read and understood by an ordinary individual. 7 U.S.C. § 136(o).

77. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 31.

78. *See id.* at 85.

79. *Id.*

80. Inter-Agency Working Group on Hazardous Substances Export Policy, Draft Report, *reprinted in* 45 Fed. Reg. 53,754 (1980).

81. Exec. Order No. 12,264, 3 C.F.R. 86 (1982).

82. *Id.* Carter's Executive Order had four major components. First, the order sought to improve the export notice procedures already required by existing statutes. Second, it called for the annual publication of a summary of United States government actions banning or severely restricting substances for domestic use. Third, it directed the State Department and other federal agencies to participate in the development of international hazard alert systems. Finally, it established procedures under which a limited number of "extremely hazardous substances," those presenting serious threats not only to human health or the environment, but also to United States foreign policy interests, would be granted export licenses only in "exceptional cases" when the importing country, fully informed, had no objection. *Id.*

83. Exec. Order No. 12,290, 3 C.F.R. 127 (1982).

84. *See Regulators Reined*, Wash. Post, Feb. 18, 1981, at A1, col. 4.

one-half years of study and hard bargaining among more than twenty federal agencies, two sets of Congressional Hearings, and the participation of over 100 business, labor, environmental, and consumer organizations here and abroad. The result of this exhaustive review was a finely-honed scalpel which could be used to control exports of only the most dangerous substances, with minimal regulatory burden and impact upon U.S. foreign trade. In contrast, the [Reagan] recission of the [Carter order] reflects a meat-ax approach to federal health, safety, and environmental regulation.[85]

D. Continued Legislative Efforts

A bill introduced in 1980 by Representative Michael Barnes (D-Md.) proposed even stronger controls than those required by the Carter Executive Order.[86] The bill, which never made it out of committee, "represented unprecedented attempts to formulate a uniform policy governing the export of hazardous substances from the United States."[87] In keeping with the 1978 House Subcommittee's recommendation that "U.S. foreign [export] policy should also be governed by U.S. determinations of morally appropriate conduct,"[88] the Barnes bill sought to restrict the export of all hazardous products by forcing exporters to obtain a government license before shipping their products overseas.[89] The license would not be issued until certain conditions were met by the exporter, the United States Government, and the government of the importing country.[90] Barnes reintroduced his bill in 1981,[91] but again the proposal died in committee.

A coalition of environmental and industry groups in the United States recently proposed that Congress adopt even stricter notification requirements for pesticide exports. In September 1985, the National Agricultural Chemicals Association (representing a large number of pesticide manufacturers) joined with more than forty environmental, consumer, and labor organizations to ask Congress to strengthen FIFRA with a series of mutually acceptable amendments.[92] This unusual agree-

85. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 87.

86. H.R. 6587, 96th Cong., 2nd Sess. (1980).

87. Comment, *Any Place But Here: A Critique of U.S. Hazardous Export Policy*, 7 BROOKLYN J. INT'L L. 329, 331-32 (1981).

88. 1978 HOUSE REPORT, *supra* note 59, at 7.

89. H.R. 6587, *supra* note 86; *see* D. WEIR & M. SHAPIRO, *supra* note 10, at 64.

90. D. WEIR & M. SHAPIRO, *supra* note 10, at 64. The Barnes bill imposed the following conditions: (1) the importing country's government would have to approve and request the product; (2) the United States government would have to determine that the potential benefits of the export outweighed the potential risks; (3) the product would have to adhere to United States labeling requirements and contain instructions the importing country's population could understand; and (4) ingredients of banned products could not be exported to formulate those banned products overseas. H.R. 6587, *supra* note 86.

91. H.R. 2439, 97th Cong., 1st Sess. (1981).

92. Envtl./Lab./Cons. Coalition and Nat'l Agric. Chem. Assoc., Agreement on Proposed

ment offers several improvements to the current law. For example, the proposed amendments would require exporters of domestically banned or restricted pesticides to notify the importer *and* an appropriate regulatory official in the importing country at least thirty days before the first export.[93] The proposed notice would also require exporters to provide more detailed information to importers.[94] The proposal would also require detailed labeling in the appropriate foreign languages.[95] The broad support among environmentalists and industry for these stricter regulations suggests that legislators should, and probably will, give the proposal serious consideration.

III

INTERNATIONAL LEGAL EFFORTS TO REGULATE THE EXPORT OF PESTICIDES

A. Unilateral State Action

One argument against domestic restriction of pesticide exports is that "unilateral action by the United States will not stop international trade in hazardous substances but will only have the effect of replacing American hazardous substances with foreign hazardous substances."[96] This argument is strengthened by the fact that the United States is by no means the sole producer or exporter of chemical pesticides. According to a study by the Economic Analysis Branch of the EPA's Office of Pesticide Programs, United States pesticides exports constituted an estimated thirty-four percent (determined by sales in dollar terms) of the world market in 1980.[97] Other major exporters include West Germany, the United Kingdom, Switzerland, France, Japan, and Italy.[98] Together, these developed countries share over ninety-five percent of the world market for pesticides. Thus, if the United States ceased exporting certain pesticides, interested purchasers could easily find alternate suppliers.

Amendments to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (Sept. 10, 1985) (available from the Natural Resources Defense Council) [hereinafter cited as FIFRA Agreement]. *See generally* N.Y. Times, Sept 12, 1985, at A20, col. 1.

93. FIFRA Agreement, *supra* note 92, at 6.

94. The notice would include the names of the exporter, the foreign purchaser, and the relevant regulatory agency for the importing country, along with a description of the active ingredient in the product and a clear statement of how and why the product is restricted domestically. *Id.* at 6-7. Under the proposed amendments, the exporter must also obtain written evidence that the importer received notification before the export can proceed and notification must be filed with the EPA *prior to* export. *Id.* at 7.

95. *Id.*

96. Comment, *supra* note 87, at 336-37.

97. U.S. E.P.A., PESTICIDE INDUSTRY SALES AND USAGE: 1980 MARKET ESTIMATES 3 (1980) (available from the Economic Analysis Branch, Benefits & Field Studies Div., Office of Pesticide Programs, U. S. Environmental Protection Agency, Washington, D.C.).

98. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 7-8 (citing 2 Y.B. INT'L TRADE & STATISTICS: TRADE BY COMMODITY, U.N. Doc. ST/ESA/STAT/SER.G/28/Add.2 (1979)).

The market substitution argument, though, does not excuse the failure of individual developed countries to consider the potentially devastating effects of their exports of pesticides to LDCs. Many industrialized nations other than the United States are becoming increasingly concerned about the health and environmental dangers of their exports of pesticides and other toxic substances. Some have begun to promulgate their own standards to reduce these dangers.[99] Also, many LDCs have enacted legislation aimed at protecting their people and environments from the hazards of imported pesticides they do not need and cannot properly handle.[100] As more exporting and importing countries adopt such regulations, it becomes less likely that unilateral efforts by the United States to restrict pesticide exports will place American producers at a disadvantage in the international market.

Unilateral action, however, raises jurisdictional as well as trade problems. The difficulties associated with conflicts of law questions and enforcement of domestic regulation abroad can reduce the effectiveness of such action.[101] For example, many United States firms are multinational companies which produce and export pesticides from bases outside the United States.[102] The ability of the United States to regulate American firms operating abroad is uncertain.[103] One commentator suggests as a solution to this problem that the United States "secure its right to exercise jurisdiction by enacting laws with provisions applying to the exportation of hazardous products by foreign-based subsidiaries, and by agreeing with the host country that the United States will have jurisdiction over such laws."[104]

Unilateral action as a solution to an essentially international problem has other disadvantages. It "tends to discourage the growth of inter-

99. Survey of Programmes and Activities for the Exchange of Information on Potentially Harmful Chemicals (In Particular Pesticides) in International Trade, 1 U.N. Environment Programme 25-28, U.N. Doc. EP/WG.96/3 (1984) [hereinafter cited as Survey of Programmes and Activities].

100. *Id.* at 23-25; *see, e.g.*, L. CALTAGIRONE, *supra* note 27, at 6.

101. Comment, *State Responsibility and Hazardous Product Exports: A Solution to an International Problem*, 13 CAL. W. INT'L L.J. 116, 127-30 (1983).

102. *Id.*; D. WEIR & M. SHAPIRO, *supra* note 10, at 24.

103. The difficulty of regulating such firms was illustrated in Fruehauf v. Massardy, 1968 D.S. Jur. 147 (1965) (Cour d'appel, Paris) (English translation appears in 5 INT'L LEGAL MAT. 476 (1966)); *see* Comment, *supra* note 101, at 129. In *Fruehauf*, an American-controlled French corporation contracted to sell equipment to another French corporation. The buyer intended to resell the equipment to the People's Republic of China. The United States ordered the American-controlled French corporation to suspend execution of the contract pursuant to the United States Trading with the Enemy Act, which prohibited American companies from doing business with Communist countries, but France insisted that the corporation honor French law and fulfill its contractual obligations. The United States conceded, apparently out of respect for French sovereignty, not because of any binding principle of international law. *See* Craig, *Application of the Trading with the Enemy Act to Foreign Corporations Owned by Americans: Reflections on* Fruehauf v. Massardy, 83 HARV. L. REV. 579 (1969).

104. Note, *supra* note 44, at 278.

national order based upon mutual accommodation, cooperation, and international law,"[105] and "may create international tensions and conflict."[106] Unilateral regulation may also interfere with international trade.[107] Some critics argue that oppressive domestic regulation will simply force exporting companies to relocate in areas without such restrictions.[108] Although this theory is popular and has intuitive appeal, empirical data indicates that very few hazardous industries are "fleeing abroad" in response to export regulation.[109] Industrial flight can also be minimized through subsidies or low interest loans which reduce the cost of complying with environmental regulations.[110]

B. An International Approach

Several mutilateral arrangements and international organizations have also begun to address the issue of hazardous exports.[111] The majority of these efforts, like those of individual countries, have focused on notification rather than export restrictions to ensure safer use of hazardous substances.

1. The Organisation for Economic Co-operation and Development

The most prominent international organization actively concerned with the issue of hazardous exports is the Organisation for Economic Cooperation and Development (OECD). The membership of the OECD consists largely of the western industrialized nations plus Japan, Australia, and New Zealand.[112] These nations include some of the most

105. Bilder, *The Role of Unilateral State Action in Preventing International Injury*, 14 VAND. J. TRANSNAT'L L. 51, 83 (1981).

106. *Id.* at 84.

107. *Id.* at 86; Comment, *supra* note 101, at 130-32.

108. D. WEIR & M. SHAPIRO, *supra* note 10, at 40-41; Castleman, *How We Export Dangerous Industries*, BUS. & SOC'Y REV., Fall 1978, at 7; Brownstein, *supra* note 27, at 545; Alston, *International Regulation of Toxic Chemicals*, 7 ECOLOGY L.Q. 397, 450 (1979).

109. *See* the Article by J. Leonard in this issue of the ECOLOGY LAW QUARTERLY; *see also* J. LEONARD, ARE ENVIRONMENTAL REGULATIONS DRIVING U.S. INDUSTRY OVERSEAS? 131-40 (1984). Similar arguments were made about the effect of the United States Occupational Safety and Health Act (OSHA) on the domestic labor market, yet United States investment abroad did not increase significantly or in a consistent pattern in the years after passage of OSHA. Levenstein & Eller, *Are Hazardous Industries Fleeing Abroad?*, BUS. & SOC'Y REV., Summer 1980, at 44.

110. Alston, *supra* note 108, at 450.

111. International efforts would be more effective if individual countries actively participated. In the United States, for example, a coalition of environmentalists, labor, and industry recently proposed to Congress that "[i]n cooperation with the Department of State, other federal agencies and non-governmental and international organizations, EPA will actively participate in international efforts to develop improved and uniform pesticide research and regulatory programs." FIFRA Agreement, *supra* note 92, at 8.

112. The OECD was established on September 9, 1961. Members in 1984 were: Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain,

voracious consumers of chemical products and some of the world's largest chemical manufacturers.[113] Responding to the need for industrial controls, the OECD member nations adopted voluntary schemes for sharing information on national actions to ban consumer goods and toxic chemicals.[114] The OECD also established committees on environment and consumer policy which have begun to address the issue of export notification procedures.[115]

The OECD is also the only international organization that has taken a step beyond information-sharing and notification requirements. In cooperation with the United Nations and the European Economic Community (EEC), the OECD has succeeded in restricting the manufacture and use of certain chemicals in all twenty-four OECD member states,[116] and has promoted the "polluter pays" principle among these member states.[117]

The thrust of the OECD's work in regulating the export of hazardous substances has been in the area of information exchange. In 1977, the OECD Chemicals Group established a "Complementary Information Exchange Procedure."[118] In 1980, the OECD's Special Programme on the Control of Chemicals set up an Expert Group on Information Exchange Related to Export of Hazardous Chemicals.[119] In 1982, this Expert Group reported on the need for information on "banned or severely restricted chemicals."[120] The Group proposed a two-step notification process. The first step would be to alert the importing country to the export and to provide basic information on the chemical, including a summary of regulatory actions taken in the exporting country, the extent to which certain uses were restricted, the reasons for the restriction, and how to obtain additional information. The second step would be to provide the additional information upon request.[121] The Group provided guidelines for the implementation of this notification process, but essentially allowed each exporting and importing country to establish its own implementation procedures.[122]

The Group report, carefully tailored to provide structure while al-

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Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Yugoslavia is a special member. THE WORLD ALMANAC AND BOOK OF FACTS 1985 605 (1985).

113. O.E.C.D., CHEMICAL ASSESSMENT: INDUSTRY'S APPROACH TO SAFETY TESTING 7-10 (1976).

114. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 90.

115. *Id.*

116. Comment, *supra* note 60, at 547.

117. S. JACOB SCHERR, HAZARDOUS EXPORTS: A NEW INTERNATIONAL ORDER? (1982) (available from Earthscan, International Institute for Environment & Development).

118. Survey of Programmes and Activities, *supra* note 99, at 17.

119. *Id.*

120. Report of the Expert Group on Information Exchange Related to Export of Hazardous Chemicals at 9, O.E.C.D. Doc. Env./Chem./MC/82.1 (1982).

121. *Id.*

122. *Id.* at 11.

lowing for flexibility, was adopted by the full OECD Council in April, 1984.[123] This report seemed to demonstrate international disapproval of the Reagan Administration's preference for eliminating all notification requirements as impediments to business and for returning to the *caveat emptor* policy that governed hazardous exports before the Carter Administration's Executive Order.[124] Furthermore, the report provided a regulatory model for other international efforts, such as those undertaken by the United Nations Environment Programme.

2. *The United Nations*

The United Nations was the one of the first organizations to address the issue of international trade in hazardous substances. In 1968, the General Assembly called for a United Nations conference to consider global environmental problems.[125] In response, the United Nations held the Conference on the Human Environment in Stockholm, Sweden in 1972.[126] The recommendations of the 112 nations attending the Conference resulted in the establishment of the United Nations Environment Programme (UNEP).[127] The basic goals of UNEP are "to facilitate international co-operation in the environmental field; to keep the world environmental situation under review so that problems of international significance receive appropriate consideration by Governments; and to promote the acquisition, assessment and exchange of environmental knowledge."[128]

UNEP established a separate program, entitled "Earthwatch," to identify relevant global environmental issues and to gather and evaluate data necessary to provide an international base of information.[129] One component of Earthwatch is the International Register of Potentially Toxic Chemicals (IRPTC).[130] The purpose of the IRPTC is to "reduce the health and environmental hazards presented by chemicals by facilitating universal access to existing scientific and regulatory data."[131] A major goal of the IRPTC is to "identify the largest possible number of chemicals of international significance and collect as much data on their

123. Recommendations of the Council Concerning Information Exchange Related to Export of Banned or Severely Restricted Chemicals, O.E.C.D. Doc. C/37 (1984).

124. S. JACOB SCHERR, *supra* note 117.

125. U.N. DEP'T PUB. INFORMATION, EVERYONE'S U.N. 167 (U.N. Pub. E. 79.I.5) [hereinafter cited as EVERYONE'S U.N.].

126. U.N. Conference on the Human Environment, Stockholm, June 5-16, 1972, 1 U.N. GAOR (21st plen. mtg.), U.N. Doc. AlConf. 48/14 Rev. at 1 (1972), *reprinted in* 11 INT'L LEGAL MAT. 1416 (1972).

127. EVERYONE'S U.N., *supra* note 125, at 168.

128. *Id.*

129. *Id.* at 170.

130. *Id.*

131. Comment, *supra* note 60, at 546.

health effects as possible."[132] The IRPTC relies on other organizations for determinations of toxicity, but the burden of evaluating the information is ultimately placed on individual countries whose officials often do not have even the minimal technical background to analyze this information.[133] Despite this problem, the work of the IRPTC is a step toward more informed and uniform decisionmaking. Furthermore, because the IRPTC can facilitate the flow of information from one country to another, it may help to eliminate costly duplication of research.[134] By 1985, the IRPTC identified over 600 chemicals of international significance and prepared detailed profiles on approximately 400 of these substances.[135] The organization also publishes a quarterly bulletin with information on newly discovered chemical dangers and provides information upon request to member countries.[136]

The General Assembly of the United Nations also specifically addressed the issue of hazardous exports in 1979, when it called for member states:

> to exchange information on hazardous chemicals and unsafe pharmaceutical products that have been banned in their territories and to discourage, in consultation with importing countries, the exportation of such products to other countries.[137]

This resolution was followed by another in 1980 which requested the United Nations Commission on Transnational Corporations to consider methods for improving information sharing among nations on hazardous products.[138] A third resolution in 1981 requested United Nations agencies to help developing countries establish an independent ability to guard against imports of substances banned or severely restricted in the exporting country.[139] The 1981 resolution also encouraged member states to promulgate national legislation regulating hazardous substances.[140]

In 1982, UNEP took further action and established the Ad Hoc Working Group of Experts for the Exchange of Information on Potentially Harmful Chemicals (In Particular Pesticides) in International Trade.[141] The first meeting of the Working Group was held in March of

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132. 15 ENVTL. L. REP. (ENVTL. L. INST.) 10,158 (June 1985).

133. Comment, *supra* note 60, at n.48.

134. *Id.*

135. ENVTL. L. REP., *supra* note 132, at 10,158. Half of the profiled chemicals are used in agriculture. *Id.*

136. *Review of the Global Environment 10 Years After Stockholm: Hearings Before the Subcomm. on Human Rights and International Organizations of the House Comm. Foreign Affairs*, 97th Cong., 2nd Sess. 256 (1982) (statement of S. Jacob Scherr, Staff Attorney, Natural Resources Defense Council).

137. G.A. Res. 173, 34 U.N. GAOR Supp. (No. 46) at 189, U.N. Doc. A/34/46 (1979).

138. G.A. Res. 186, 35 U.N. GAOR Supp. (No. 48) at 202, U.N. Doc. A/35/48 (1980).

139. G.A. Res. 166, 36 U.N. GAOR Supp. (No. 51) at 193, U.N. Doc. A/36/51 (1981).

140. *Id.*

141. Report of the First Session of the Ad Hoc Working Group of Experts for the Ex-

1984 and was attended by experts from twenty-nine countries and representatives from several United Nations organizations, the OECD, and twelve other inter-governmental and private organizations.[142] As a result of this meeting, UNEP adopted a "Provisional Notification Scheme for Banned or Severely Restricted Chemicals."[143] Under this scheme, all countries are to designate a national authority for exchanging information, to provide the national authorities of other countries with information on and a summary of actions taken with respect to any domestically restricted chemical, and to authorize a contact for further information.[144] The Notification Scheme also directs that, if an export of a banned or severely restricted chemical occurs, the exporting country should provide the importing country with further information.[145] As of November 1984, thirty-three countries had informed the IRPTC of their designated national authorities and two of these authorities had provided the IRPTC with information on chemicals banned or severely restricted in their country.[146] This is a positive response, but it is hard to predict whether countries will continue to provide information to the IRPTC or whether the IRPTC will be able to disseminate such information effectively.

In preparation for its first meeting in 1984, the Ad Hoc Working Group conducted a comprehensive survey of international efforts to exchange information about potentially hazardous chemicals.[147] This survey includes a description of the current programs of UNEP and other United Nations bodies, special United Nations agencies such as the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), inter-governmental organizations such as the OECD, and private industrial, environmental, and consumer protection agencies. The survey also summarizes the laws of both exporting and importing countries regulating international trade in hazardous chemicals. This survey in itself is a particularly significant contribution to the effort to facilitate the exchange of information on the export of hazardous chemicals, including pesticides.

C. The Problem of Confidential Data

The UNEP survey indicates that the notification concept is popular

change of Information on Potentially Harmful Chemicals (In Particular Pesticides) in International Trade, 1 U.N. Environment Programme at 1, U.N. Doc. EP/WG.96/5 (1984).

142. *Id.* at 2.

143. Implementation of the Provisional Notification Scheme for Banned and Severely Restricted Chemicals, Progress Report Prepared By IRPTC, 2 U.N. Environment Programme, U.N. Doc. EP/WG.112/2 (1984).

144. *Id.* at Annex I.

145. *Id.*

146. *Id.* at 3.

147. Survey of Programmes and Activities, *supra* note 99.

among the more than two dozen international agencies concerned with the problem of pesticide exports. Nearly every organization surveyed had established some program for information exchange.[148] The actual exchange of information, however, may be hampered by fear on the part of pesticide manufacturers that their competitive position in the industry will be damaged by public dissemination of confidential trade secret information.

In July 1983, the OECD addressed the problem of the exchange of confidential data. The Council recommended that "[m]ember countries take steps towards creating conditions which will allow the exchange of confidential data," suggested that member countries "explore the use of" a set of Suggested Principles to Govern the Exchange of Confidential Data, and invited member countries to report any arrangements concerning the transmission of confidential data to the OECD Special Programme.[149] The Council instructed the Special Programme's Environment and Management Committees to review actions taken by member countries in accordance with these principles and report back to the Council.[150]

The Principles are set forth in an appendix to the Council's recommendation and make several proposals. First, the competent authorities of countries should exchange confidential information on chemicals to assess their hazards and to protect human health and the environment.[151] This information should not be used for any other purpose.[152] Second, a requesting country must substantiate the need for chemical information by showing that the chemical is available or is shortly to be available in its territory, and that the information is necessary for the assessment of its hazards and the protection of human health and the environment.[153] Third, a requesting country must respect the transmitting country's decision regarding the confidential nature of the data. The requesting country may make the information available only within its territory, only when necessary, and only after obtaining assurance that the recipients can guarantee the same level of confidential treatment.[154] Finally, the solicited country should consult with the person who submitted the requested confidential information before transmitting it to the requesting country to determine the risk attending disclosure. The final decision to transmit any confidential data would be left to the government, however, not to the submitter.[155] These guidelines may serve to increase the confi-

148. *Id.*
149. O.E.C.D. Council Recommendation Adopted July 26, 1983, C/97(Final) at 2 (1983).
150. *Id.*
151. *Id.* app. at 6.
152. *Id.* app. at 7.
153. *Id.*
154. *Id.* app. at 8.
155. *Id.* app. at 10. The Council explained that the Principles were based on the following

dence of those transmitting information that the information will not be used to their detriment. Consequently, the transmitters may be more willing to provide such information on request.

D. Beyond Notification

Assuming that the barriers to information exchange such as the need for confidentiality can be overcome, notification is just one step toward an environmentally sound international policy for the export of pesticides to LDCs. Due to economic and information limitations, the massive quantities of technical data flowing between pesticide importing and exporting countries may overwhelm those nations that most need the information. Further, even if all the chemical data and the various national regulations restricting domestic use could be read and evaluated, it is unlikely that LDCs could fully use this information because they lack adequate technical and ecomomic resources.[156] Other steps beyond notification are both available and feasible.

1. Export Restrictions

Few attempts have been made to impose direct restrictions on the international trade in pesticides. The United States is alone in requiring that foreign purchasers acknowledge that a certain pesticide is banned in the United States before the exporter can ship the pesticide abroad.[157]

As one commentator observed: "If industry is to be expected to develop innovative solutions to these problems, if banks are to be expected to finance new technologies, something will have to be done to make exporting the hazards of current technology less attractive."[158] But trade restrictions do not appear to be forthcoming. Nor do such restrictions necessarily follow as the next logical step after implementation of an effective notification scheme. The philosophy behind the currently successful notification programs is "informed consent" rather than paternalistic control. The latter approach is politically unpopular from

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goals: (1) the exchange is intended to transmit data already available to the competent authority, and not to make the transmitting authority gather and develop new data for this purpose; (2) a competent authority in the requesting country must have made every reasonable effort to obtain the information available in its own country before requesting confidential information from another country; (3) exchanges of confidential data should not distort competition or have the effect of subjecting nationals of the solicited country to stricter standards of testing or notification than would apply to nationals of the requesting country, or of exempting nationals of the requesting country from conforming to the notification requirements of their own country; (4) all data made available to a requesting country should remain the property of the individual or company who submits the information to the extent it would have done so within the original country. *Id.* app. at 7-9.

156. PILLS, PESTICIDES, AND PROFITS, *supra* note 9, at 34-35.

157. Survey of Programmes and Activities, *supra* note 99, at 25-28; *see supra* note 74 and accompanying text.

158. Castleman, *supra* note 108, at 14.

several perspectives: the pesticide manufacturers are likely to see it as government interference with their profitable business and the LDCs are likely to view it as "eco-imperialism."[159]

2. *Improved User Training*

The growing number of governments and international organizations concerned with the problems of using chemical pesticides in developing nations have embraced the principle of informed consent, implemented through an international notification system, as the primary means of solving the problems of pesticide misuse. While these governments and organizations have raised worldwide awareness of this problem and generated useful information, it remains doubtful that those affected most directly by the hazards of these chemical compounds are truly "informed" or have given their "consent." In addition to intergovernmental notification, the widespread training of local users in pest management is needed to control the dangers associated with pesticide use in developing countries. Pesticide users, not just regulators, must begin to understand the dangers of these chemicals and how to minimize the problems of misuse. Consumers should be informed that cheap, effective, and safe alternatives to chemical pesticide use exist in many cases.

Educational institutions, such as the University of California's Center for Biological Control, and international organizations, such as the Pesticide Action Network, discussed below, have trained natives of developing countries in pest management for several years. But these efforts are relatively small compared to the magnitude of the problem. A serious program of widespread training requires far greater resources than currently provided by these organizations. A program to develop international symbols for pesticide labeling would be an important first step toward informed use; this proposal is both feasible and manageable under current notification schemes. Such symbols would indicate the dangers of the pesticide, guidelines for proper handling and use, and what action to take in the event of human poisoning.

Governments and international organizations should also increase efforts to improve pesticide user training.[160] The OECD, for example, could increase its collection of information on pesticides and pesticide regulation and distribute this information directly to organizations providing user training. Governments and multilateral development assistance programs could make pesticide user training a condition of agricultural and disease eradication programs that fund pesticide purchases, and could also establish their own user training programs.

159. *See* notes 64-65 and accompanying text; *see generally* Comment, *supra* note 60.

160. *See generally* CROP PROTECTION SITUATION, *supra* note 37.

3. Private Efforts

Several private environmental and consumer organizations have also recently begun to address the issue of international pesticide misuse on an international level. One group devoted specifically to this issue, Pesticide Action Network (PAN) International, was established at a conference on global pesticide trade sponsored jointly by the International Organization of Consumer Unions and Friends of the Earth—Malaysia in 1982 as a "worldwide coalition of non-governmental organizations based in 16 countries [to] call for a halt to the indiscriminate sale and misuse of hazardous chemical pesticides throughout the world."[161] PAN stresses that it does not advocate immediate withdrawal of all chemical pesticides from the world market because that would impose an unacceptable hardship on farmers and public health programs, but as one member stated: "We must all work towards the day when we can live in a world free of hazardous chemical pesticides. We must break the pesticide habit."[162]

PAN and similar public interest groups have recently increased their efforts to improve education within LDCs and to encourage private, voluntary controls on the export and use of chemical pesticides. For example, the International Federation of Plantation, Agricultural and Allied Workers keeps its affiliates informed of potentially hazardous agrochemical developments through newsletters.[163] In 1983, the International Organization of Consumer Unions established a "consumer action resource kit" on forty-four hazardous chemical pesticides, and PAN hosted a seminar in Africa on the use and handling of agricultural and other pest control chemicals.[164]

Industrial producers and marketers of chemical pesticides have also responded to the increased public awareness and concern over pesticide exports. Some trade groups have met with consumer and environmental organizations to consider guidelines for the international pesticide market. One such organization, the Agricultural Chemicals Dialogue Group, was started in the United States in 1982 to address the "formidable challenge to proper use of agricultural chemicals in developing countries."[165] The goal of the group is to develop "guidelines of product

161. Inst. for Food & Dev. Pol'y, News Release (June 22, 1982).

162. *Id.*

163. Survey of Programmes and Activities, *supra* note 99, at 23.

164. *Id.* These groups also serve another function by lobbying the national and intergovernmental bodies that regulate pesticides. For example, the International Union for Conservation of Nature and Natural Resources adopted a resolution in 1981 calling for all countries to prohibit export of domestically banned pesticides except when no alternative means of pest control is available, and then only at the explicit request of the government of the importing country. *Id.* at 21-22. PAN passed a similar resolution calling for explicit consent of importing countries before a banned pesticide may be exported. *Id.* at 23.

165. Description, Agricultural Chemicals Dialogue Group (May 27, 1982) (on file with author).

stewardship" for worldwide adoption.[166] Along similar lines, the International Group of National Associations of Manufacturers of Agrochemical Products, which represents chemical industry associations in twenty-five countries, has published several sets of guidelines, including "Safe Handling of Pesticides During Formulation, Packing, Storage and Transport,"[167] and it is in the process of preparing a set of guidelines on field emergency first aid.[168] These efforts are significant and should be encouraged; in particular, this information should be made available to user training organizations or to the pesticide users themselves.

4. Tort Liability

Some developing countries are appropriately skeptical of the effectiveness of such self-imposed stewardship. They have responded to the need for better quality control and marketing practices by imposing legal liability on chemical companies that do not comply with established standards.[169] The issue of liability in international law for damages resulting from pesticide production will undoubtedly be affected by the recent tragedy in Bhopal, India in which over 2000 people died and more than 75,000 were injured when methyl isocyanate escaped from Union Carbide's pesticide plant.[170] One commentator suggested that any country that is a party to an international convention prescribing guidelines for production, testing, notification, and labeling of pesticides—such as OECD member states—should be held liable for injuries caused by any product it exports in violation of the convention's guidelines.[171] Such a system might prove a feasible alternative to trade restrictions because the OECD membership includes many of the major exporters and importers of pesticides.

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166. *Id.*

167. Survey of Programmes and Activities, *supra* note 99, at 21.

168. *Id.* Even individual chemical companies are acknowledging the need for export controls. In a 1981 letter to David Bull of Oxfam International, the Vice President of Velsicol Chemical Corporation wrote: "We believe that mankind is better off using our products wisely than not using them at all. Velsicol strongly supports the current [U.S.] regulations concerning pesticide exports. We believe and carry out the policy of providing detailed information on our products to all our world-wide customers." Letter from Richard F. Blewitt, Vice President, Corporate Affairs, Velsicol Corporation, to David Bull (Dec. 14, 1981). In 1982, the Swiss company Ciba-Geigy wrote to Mr. Bull: "[W]e agree that governments must ensure that potentially harmful agrochemicals which are unacceptable for domestic purposes in the exporting country are not permitted to be exported without the knowledge and consent of the appropriate authorities in the importing countries." Letter from T.W. Parton and H. Aebi to David Bull (Feb. 23, 1982). *See also* FIFRA Agreement, *supra* note 92.

169. PILLS, PESTICIDES AND PROFITS, *supra* note 9, at 32. At present, however, no international treaties or agreements address the liability of an exporter of domestically-banned substances. Comment, *supra* note 60, at 546.

170. Broder, *Anatomy of a Catastrophe*, Boston Globe, Dec. 9, 1984, at 1, col. 2. For a discussion of the Bhopal tragedy, see the Article by Nicholas A. Ashford and Christine Ayers in this issue of the ECOLOGY LAW QUARTERLY.

171. Comment, *supra* note 101, at 140.

5. Integrated Pest Management

Other countries and organizations are seeking to reduce the dependence of LDCs on chemical pesticides by promoting the understanding and availability of effective, less hazardous alternatives. The most common proposal for reducing the use of chemical pesticides is a form of pest control known in the scientific community as Integrated Pest Management (IPM). This concept of pest control is not susceptible to a simple definition. Robert van den Bosch, who conducted extensive research on IPM at the University of California's Center for Biological Control in Berkeley, observed that IPM is "simply rational pest control"[172] and that,

> [u]nder integrated control, natural enemies, cultural practices, resistant crop and livestock varieties, microbial agents, genetic manipulation, messenger chemical, and yes, even pesticides become mutually augmentative instead of individually operative or even antagonistic, as is often the case under prevailing practice . . . .[173]

The goal of integrated pest control is not pest eradication, but rather reduced cost and increased long-range efficiency of pest management and crop protection, and decreased dependence on specific chemical pesticides.[174] The theory behind IPM was developed over several decades by entomologists, mostly in the United States and Canada, concerned with the "misuse, overuse, and unnecessary use of insecticides."[175] Under conventional methods of pest control, "one turns on the chemical switches, sits back, and lets the insecticides do the job."[176] In contrast, proponents of integrated pest control believe that "insecticides for use in IPM programs should be selected based on their overall safety to humans, domestic animals, nontarget organisms, and the environment, as well as their specific effectiveness against the target species."[177]

A system of integrated control does not mean the complete abandonment of pesticides, but integrated pest management applied on an international scale could effectively reduce excessive or unnecessary pesticide use.[178] Robert L. Metcalf, a noted expert on IPM, believes that a global pesticide policy based on this concept and restrictions on the use of the most highly toxic chemical pesticides could virtually eliminate the widespread incidence of human poisoning by pesticides.[179] Metcalf further suggests that "widespread application of IPM will have dramatic effects on the total quantities of insecticides entering the environ-

172. R. VAN DEN BOSCH, *supra* note 20, at 151.
173. *Id.* at 152.
174. J. PERKINS, *supra* note 19, at 79-81.
175. Metcalf, *supra* note 17, at 240-50; *see* J. PERKINS, *supra* note 19, at 67-78.
176. R. VAN DEN BOSCH, *supra* note 20, at 154.
177. Metcalf, *supra* note 17, at 251.
178. J. PERKINS, *supra* note 19, at 278-79.
179. Metcalf, *supra* note 17, at 250-51.

ment,"[180] and points to estimates that a thirty-five to fifty percent reduction of insecticide usage could be made by eliminating unnecessary treatments.[181] Some programs of integrated control applied in California have successfully reduced both pests and costs.[182]

Whether these successes of IPM may be duplicated in developing countries is difficult to predict. According to Leonardo Caltagirone, Professor of Entomology at the University of California at Berkeley's Center for Biological Control, no reliable studies exist on the effectiveness of pesticides used in LDCs or on how crops or human and environmental health in these countries would be affected by reduced application of chemical pesticides through IPM.[183] Attempts to introduce IPM in Central America have, however, met with some success. In Nicaragua, for example, "the pest control scene is dominated by the current program on integrated control of insect pests of cotton," a program implemented jointly by the Ministry of Agriculture, the National Bank of Nicaragua, the National University of Nicaragua, and the Food and Agriculture Organization.[184] The Nicaraguan personnel involved in IPM projects are "enthusiastic and fervently convinced of the virtues of integrated control," and intend to apply IPM through similar programs on other crops.[185] According to Caltagirone, these enthusiasts may be "putting the cart before the horse" because there is a "dire need for . . . more entomologists considerably better trained before embarking in any kind of sophisticated entomological or ecological research."[186]

Integrated pest management also has several powerful opponents, notably the agri-chemical industry, federal and state pest control agencies, large growers, and the bankers who finance large-scale agriculture.[187] Despite industry's general opposition, though, it has, in fact, often contributed to the use of IPM "through the development of new application and formulation techniques and novel chemical approaches to pest management."[188] The concept also appears to be increasingly favored by such agencies as the United Nations Food and Agriculture Organization (FAO) and USAID. The FAO, in conjunction with UNEP, formed a Co-operative Global Programme for the Development and Application of Integrated Pest Control in Agriculture in 1974, and USAID, in conjunction with the University of California, formed the Pest Management and Related Environmental Protection Project (now called the

180. *Id.* at 251.
181. *Id.*; *see also* note 36 and accompanying text.
182. R. VAN DEN BOSCH, *supra* note 20, at 172-73.
183. Interview with Leonardo Caltagirone, *supra* note 42.
184. CROP PROTECTION SITUATION, *supra* note 37, at 22.
185. *Id.* at 23.
186. *Id.*
187. R. VAN DEN BOSCH, *supra* note 20, at 173-77.
188. D. BULL, *supra* note 1, at 129.

Consortium for International Crop Protection).[189] Great Britain's Centre for Overseas Pest Research also offers training courses in LDCs on pesticide management.[190]

The increasing cost of chemical insecticides may encourage the search for alternative pest control strategies. The cost of pesticides has increased mainly because these products are largely petrochemicals, and the development of newer and more effective insecticides requires increasingly sophisticated chemical synthesis.[191] Stringent registration requirements and inflation also drive up the price of these products.[192] Despite the high price tag, use of some pesticides is likely to continue because of the lack of effective substitutes.[193]

CONCLUSION

To resolve issues of pesticide misuse in LDCs, countries should stop viewing the adverse health and environmental effects of pesticides as "someone else's problem." The common and critical factors in most cases of local misuse are insufficient financial resources, inadequate education, and weak or wrong economic incentives. Yet one centralized, uniform answer will not solve this important international dilemma. The appropriateness of specific solutions varies considerably with the individual economic and environmental values of each consuming country. Many countries and several international organizations have attempted to correct these problems through legislation and agreement, but the chemical industry, the governments of LDC's, and the users of pesticides have been slow to respond. Proposals to increase user knowledge and to apply IPM should be encouraged. The most promising sign of progress, however, is the increasing recognition that pesticide misuse and overuse in developing countries is not merely a regional or individual state problem, but a global issue.

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189. *Id.* at 130.

190. *Id.*

191. Metcalf, *supra* note 17, at 224.

192. *Id.*

193. *See* text accompanying note 34; *see also* Luck, van den Bosch & Garcia, *supra* note 20, at 609.