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PROPERTY RIGHTS, PESTICIDES, & PUBLIC HEALTH: EXPLAINING THE PARADOX OF MODERN PESTICIDE POLICY

Andrew P. Morriss & Roger E. Meiners***

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Today malaria kills approximately one million people a year, mostly children, and sickens hundreds of millions more.¹ This tragedy is most pronounced among the poor in underdeveloped countries with warm climates, where mosquitoes breed readily and there are few resources to combat the problem. There is presently no vaccine for malaria,² only costly treatments to reduce the effects that most of malaria's victims cannot afford. These deaths and illnesses are almost entirely preventable through an inexpensive generic chemical which, when used properly, has almost no environmental side effects.

Spraying this chemical on the walls of residences in Africa, Asia, and Latin America can inexpensively and effectively control the spread of disease-bearing mosquitoes and some other insects. Used in this manner, the evidence from decades of use is that the chemical has no ill effects on humans and minor impacts on the environment, except on disease-carrying insects. Applied once every six months,

1. Amir Attaran, Donald R. Roberts, Chris F. Curtis, & Wenceslaus L. Kilama, *Balancing Risks on the Backs of the Poor*, 6 *NATURE Med.* 729 (2000) [hereinafter ATTARAN, ROBERTS, CURTIS & KILAMA].

2. There are drugs that can be taken to avoid getting malaria. The most common of these, Lariam, is now reported to have serious psychological side-effects, including suicide. See Vanessa Fuhrmans, *Malaria-Drug Maker to Warn of Suicide Risk*, WALL ST. J. at D1 (Sept. 4, 2002). Attempts to develop a vaccine have produced one that is only 90% effective; "the incomplete protection raises fears that any vaccination program could cause the pathogen to mutate into a more lethal form." Victoria Griffith, *Studies Reveal Difficulty in Controlling Malaria*, F. TIMES at 7 (July 19, 2002). (Scientists believe malaria "is so complex that a single vaccine is unlikely to eradicate the infection.").

the mosquito problem is greatly reduced. Millions of lives can be saved and hundreds of millions could suffer less. Unfortunately, the chemical is DDT.³

The use or manufacture of DDT is banned in most countries today.⁴ Led by environmental groups, an organized effort is underway to eliminate the last few countries that allow its manufacture and use.⁵ The loss of this potent and inexpensive tool in the fight against malaria and other insect borne illnesses will cost millions of lives throughout the developing world.

How we came to the current state of affairs – allowing millions, including millions of children, to suffer and die because of a ban on a pesticide that would solve a pressing health problem at low cost – is a story that goes back many years. This state of affairs has its origin in a history of abuse of pesticides. That abuse was caused in large part by the refusal of the U.S. federal and state governments to respect property rights. Had governments been held to the same standard of care for the rights of citizens that citizens are required by the common law to have for each other, the destructive policies of the past would have been avoided and the tragedy of the increase in malaria today would be unlikely to exist. In short, respect for property rights would have encouraged more responsible use of pesticides and avoided many of the problems that resulted from their overuse.

The lesson of DDT's rise and fall is that property rights play a critical role in checking public policy abuses. Respect for property rights requires public actors to obtain property owners' consent be-

3. The full chemical name for DDT is dichlorodiphenyltrichloroethane.

4. See International POPS Elimination Network, *DDT & Malaria: Answers to Common Questions*, available at <http://www.ipen.org/DDTenglish.pdf> (last visited Sept. 5, 2002) (noting that according to the U.N. only 19 countries are currently using DDT to fight malaria and that only six are "recent" users) [hereinafter INTERNATIONAL POPS ELIMINATION NETWORK].

5. See, e.g., World Wildlife Federation, *WWF's Efforts to Phase Out DDT*, available at <http://www.worldwildlife.org/toxics/progareas/pop/ddt.htm> (last visited Sept. 5, 2002) ("WWF has been involved in a special effort to inform, educate, and convince the public and policymakers about the dangers of DDT and the need to phase out and ban its use.")

fore they take actions (e.g. pesticide spraying) that affect the property owners. When property rights are respected, spillover impacts are minimized. Public policies imposed without consent, even if done with good intentions, may produce bad effects. Those effects may result in the policy being rightly abandoned, but may also spur other policies that produce more bad effects. Only by consistent respect for property rights, by both governments and private parties, can we hope to avoid environmental and human catastrophes in the future.

In Part I of this Article, we briefly describe the use of pesticides during the twentieth century, emphasizing the government's mass-spraying programs of the 1950s and 1960s that prompted the current federal regulatory framework. In Part II we describe the problem of malaria control today, show how pesticides including DDT have an important role to play in alleviating human misery and saving lives, and explore why environmental organizations are preventing development of a rational malaria control policy. In Part III we outline how the common law handles pesticide problems and how an environmental law built around the common law could address pesticide issues today. Part IV concludes the article with a discussion of the costs of the command-and-control regulatory framework for pesticides and the alternative of a common law-property rights approach to pesticide problems.

I. THE DEVELOPMENT OF PESTICIDE USE IN THE UNITED STATES

Pesticide use and regulation in the United States has had four distinct periods in which the pesticides used, public opinion toward pesticides, and regulatory policies applied to pesticides have varied. In this section we describe each of these periods.

A. *The Pre-Modern Era*

At the beginning of the twentieth century, pests - not pesticides - were seen as the more serious threat to human health and well-being.⁶ This was true despite the acutely toxic nature of many early

6. The same phenomenon has been at work elsewhere. In the nineteenth and early twentieth centuries, governments expended considerable resources to eradicate predators and drain wetlands. In the late twentieth and early twenty-first centuries, even larger

pesticides, which were often based on inorganic compounds such as lead and arsenic.⁷ Indeed, among the efforts at government regulation of pesticide use were state laws, such as one enacted by Washington state to force apple farmers to use more pesticides (generally arsenic-based products), not fewer.⁸ Farmers who sprayed saw their non-spraying neighbors as getting the benefits of the sprayers' expenditures on pest control, while not contributing to pest control themselves. In economic terms, the non-sprayers were "free riders" – taking advantage of the efforts of others without contributing. Non-sprayers thus gained a competitive advantage (lower costs because they did not have to pay for spraying) over the sprayers. To solve the so-called free-rider problem, the sprayers turned to their state legislatures to force their non-spraying neighbors to contribute to the common good of wiping out the pests that threatened all their apple crops.

The two major problems with early pesticides were acute toxicity and fraud. Because the active ingredients were highly toxic substances like arsenic, working with pesticides, or ingesting foods with pesticide residues, was extremely hazardous. Controversy over pesticide residues was a regular feature of the pre-World War II period.⁹ The problem of fraud was almost the mirror image of the acute toxicity problem: Products not based on acutely toxic substances often simply did not work as advertised. Fly-by-night operators could bilk farmers for substantial sums by selling them products with no ability to kill pests. Early regulatory efforts, such as the federal Insecticide Act of 1910, were aimed at removing ineffective products from the market and avoiding acute poisonings that could result from the pes-

amounts of resources are now being focused on undoing those earlier efforts.

7. See JOHN WARGO, *OUR CHILDREN'S TOXIC LEGACY* 67 (1996) ("Lead arsenate and calcium arsenate (which was introduced in 1917) were the pesticides most commonly used between 1917 and 1942") [hereinafter WARGO].

8. JAMES WHORTON, *BEFORE SILENT SPRING: PESTICIDES AND PUBLIC HEALTH IN PRE-DDT AMERICA* 74 (1974) [hereinafter WHORTON].

9. See WARGO, *supra* note 7, at 67-70 (discussing various pre-War issues over tolerances and residues).

ticides that were overly effective.¹⁰ Pesticide legislation thus mirrored the regulatory approach taken to patent medicines, where there were similar concerns, particularly about fraudulent claims of effectiveness.¹¹

B. *The Honeymoon*

World War II brought attention to new pest problems. Soldiers, fighting under less than sanitary conditions, proved ideal victims for a variety of pest-borne diseases, including malaria.¹² Controlling lice, mosquitoes and other disease vectors became a major military

10. Andrew P. Morriss, *Pesticides and Environmental Federalism: An Empirical and Qualitative Analysis of § 24(c) Registrations*, in *ENVIRONMENTAL FEDERALISM* 137 (Terry L. Anderson & Peter J. Hill eds., 1997) [hereinafter MORRISS].

11. Jeffrey E. Shuren, *The Modern Regulatory Administrative State: A Response To Changing Circumstances*, 38 *HARV. J. on LEGIS.* 291, 300 (2001) (“To a large degree, the [Pure Food and Drug Act of 1906] focused on preventing economic fraud rather than protecting the public from deleterious drugs”).

12. Wargo describes how wartime conditions favor malaria transmission:

“Troops live outdoors and are therefore easy targets for mosquitoes; once they move into malarious regions, disease incidence and severity among soldiers is normally high due to lack of immunity; troops are concentrated, which makes transmission more likely; and combatants are generally weakened by fatigue, poor nutrition, and poor sanitation. In addition, military objectives normally include control over ports, rivers, and water supplies, which are the primary habitats of mosquitoes. Troop movement itself can exacerbate the spread of the disease by inadvertently carrying the parasite into regions previously malaria-free. Military tactics such as widespread shelling, bombing, and, more recently, herbicide-induced defoliation all increase standing water, the preferred breeding site for mosquitoes.”

WARGO, *supra* note 7, at 30.

concern.¹³ Small wonder then that DDT's discovery was hailed as a modern miracle. Nontoxic to humans, more effective than the alternatives, and cheap and easy to apply, DDT was an important public health advance. It was first used late in World War II when, sprayed on soldiers and civilians, it killed body lice, thereby stopping a typhus epidemic in Italy.¹⁴ Spraying DDT from the air on islands in the Pacific relieved the troops of the many miseries, especially malaria, caused by mosquitoes. Moreover, DDT was not only more effective against pests, it was much safer than the inorganic pesticides it replaced. Seen as generally harmless for humans, DDT's release to civilian use on August 31, 1945¹⁵ was hailed as a boon and its production rose rapidly. "It is hard to overestimate the impact that DDT's early success had on the world of public health."¹⁶ Its inventor, Paul Müller, was awarded the Nobel prize in medicine. DDT became so popular it was even thrown in place of rice at some weddings.¹⁷ Other new chemicals joined DDT in the marketplace as pesticide manufacturers realized the economic gain from solving pest problems with new types of chemicals.

Cheap and effective on a wide range of pests that inflict misery on humans, and safer than the alternatives, the use of these new chemicals such as DDT spread rapidly, with pesticide use increasing five-fold between 1950 and 1970.¹⁸ As one scholar noted, looking back on that period, "civilians bought 'bug bombs' to destroy insects in their homes and gardens, while trucks and airplanes sprayed clouds of the inexpensive insecticide over fields and neighborhoods, often using far more than recommended and carelessly engulfing animals

13. The development of DDT and its initial military uses are well described in Malcolm Gladwell, *The Mosquito Killer*, *THE NEW YORKER* 42, 42-44 (July 2, 2001) [hereinafter GLADWELL].

14. THOMAS R. DUNLAP, *DDT: SCIENTISTS, CITIZENS, AND PUBLIC POLICY* 61-63 (1981) [hereinafter DUNLAP].

15. Holly Lippke, *DDT: An Overview* (unpublished manuscript on file with authors) [hereinafter LIPPKE].

16. GLADWELL, *supra* note 13, at 44.

17. WHORTON, *supra* note 8, at 248.

18. WILLIAM ROGERS, *ENVIRONMENTAL LAW* 399 (2 ed. 1994) [hereinafter ROGERS].

and people. Most of us didn't care then."¹⁹ Agricultural use of pesticides also soared. Insect pests were a major threat to crops, with the average annual loss from pests and disease estimated at \$360 million in 1945.²⁰

The pre-World War II free-rider problem remained, however. Not everyone could afford, or wanted to use, chemical means of pest control. Control of pests presented a classic "public good" problem: no single landowner or group of landowners could control all the pests in an area. If any failed to act, and act in a coordinated fashion, the pest would escape being eliminated and reinfest the pest-free areas. The obvious solution was public provision of a variety of pest control services, enabling efficient, coordinated coverage of large areas. Government agricultural agents taught farmers the virtues of pest control. Government programs applied pesticides to control pests. Government scientists worked to discover new means of using pesticides to make agriculture more productive.

The U.S. Department of Agriculture in particular promoted widespread spraying of DDT and many other pesticides throughout the 1950s and into the 1960s. To give just one example, DDT production grew from 38 million pounds in 1953 to 125 million pounds in 1959.²¹ Pesticide operations under USDA control grew rapidly with bipartisan support in Congress. As a member of the House agriculture committee said, "We expect the Department of Agriculture, in cooperation with the land grant colleges and experiment stations and ... with insecticides producers and the chemical industry, to develop pesticides that will control what is left of the immune insects that attack what we produce and present to the American consumer."²² Enthusiasm was, if anything, even greater in the Senate, where Senator Allen Ellender said, in 1953, that pesticide use would help agriculture, thereby improving national security and helping to defeat communism.²³

19. Allan Manzur, *Why Do We Worry About Trace Poisons?*, 7 RISK: HEALTH, SAFETY & ENV'T 35, 35 (1996) [hereinafter MANZUR].

20. CHRISTOPHER J. BOSSO, PESTICIDES AND POLITICS: THE LIFE CYCLE OF A PUBLIC ISSUE 28 (1987) [hereinafter BOSSO].

21. *Id.*, at 31; DUNLAP, *supra* note 14, at 254.

22. BOSSO, *supra* note 20, at 69.

23. *Id.*

Pesticide regulation also changed after World War II. In 1947 the federal government began to take a more significant role, largely in response to pesticide manufacturers' concerns over the impact of increasing state regulation.²⁴ With the development of new forms of pesticides, based on the war-time discoveries of the pesticidal properties of chemicals like DDT, the pesticide market was changing. Whereas the pre-DDT pesticide market had had multiple formulations of a few active ingredients, with a significant role for local manufacturers, the pesticide market was now becoming increasingly national as companies with expertise in the type of research and development efforts necessary to discover and produce these new products increased their position in the field. Faced with potentially expensive compliance with inconsistent state requirements (e.g. the requirement that the label list a state's registration information), the industry successfully lobbied for a federal role. The result was the 1947 Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA").²⁵

This statute was built around the same efficacy and acute health concerns as the earlier state and federal regulation,²⁶ it did not give USDA any significant regulatory powers. For example, the statute gave USDA only weak powers to require manufacturers to submit proof of efficacy to the agency and required manufacturers to register their products with the agency. At the same time, it denied the USDA the ability to refuse to register a product.²⁷ Manufacturers thus had the best of all possible worlds – no significant limitation on their ability to manufacture and sell effective pesticides, limits on illegitimate competitors' ability to sell ineffective products, preemption of state regulation in some areas, and federal regulatory authority located in a sympathetic agency whose primary mission was to assist farmers, not to regulate chemical use.

The pesticide manufacturers, users, and regulators formed yet another example of the enduring "iron triangle" of politicians, bureaucrats, and special interests in Washington.²⁸ The USDA and members of Congress gained political credit by using tax dollars to subsidize agricultural production through promotion of chemical use,

24. See MORRISS, *supra* note 10, at 139.

25. 61 Stat. 163 (1947).

26. See ROGERS, *supra* note 18, at 415.

27. MORRISS, *supra* note 10, at 139.

28. BOSSO, *supra* note 20, at 11.

while simultaneously pleasing the makers of assorted chemicals. While we can look back skeptically upon their behavior now, there is no doubt that the sense of mission in promoting agriculture through pesticide use was sincere and made the special interests' work easier by giving a public interest rationale for the programs they sought.²⁹ DDT and other new pesticides were cheap solutions to the boll weevil and other scourges that blighted agriculture. Promoting their use would result in greater agricultural productivity, benefiting farmers, consumers and the national interest.

From the vantage point of the 1950s, promotion of DDT and other pesticides was no different economically than most other government programs. An important role for government, economists taught, was the subsidization of "public goods," those goods for which no one person could capture all the economic benefits of providing.³⁰ If Farmer Jones sprayed his fields for a pest, so the thinking went, he saved Farmer Smith next door some money, since fewer hungry bugs would live to migrate from Jones' farm to Smith's farm in search of food. Since Smith would not be likely to pay Jones for the reduction in pests on Smith's farm brought about by Jones' spraying, Jones would not spray "enough." The result: "too many" pests and "too little" pesticide use. To get to the "efficient" level of spraying therefore required either forcing Smith to spray (the approach taken by Washington state with apple growers in the early 1900s) or subsidizing Jones via general treasury funds granted to the

29. Such coalitions between "bootleggers" and "Baptists" are an important part of the political debate. Much as actual bootleggers ally with actual Baptists to lobby for liquor control statutes – benefiting the bootleggers by reducing their legitimate competition and the Baptists by restricting the availability of liquor – other interest groups find it useful to ally with an ideological or moral cause to promote policies in their self-interest. See Bruce Yandle, *Bootleggers and Baptists: The Education of a Regulatory Economist*, REG., May/June 1983, at 12. See also Bruce Yandle & Stuart Buck, *Bootleggers, Baptists, and the Global Warming Battle*, 26 HARV. ENVTL. L. REV. 177 (2002) (applying theory to explain global warming debate).

30. See R.H. COASE, *THE FIRM, THE MARKET AND THE LAW* 188-191 (1988) (discussing economic literature's use of public goods arguments). The same rationale continues to be used today to justify programs such as national parks and highways.

USDA. As public choice theory has pointed out, subsidies are the politically more attractive option relative to taxes or other means of coercion, since the recipient is pleased to receive the subsidy and the taxpayers who fund the subsidy are rarely aware of the costs of the program, since it is spread over millions of taxpayers.³¹

The USDA took several approaches to promoting pesticide use. First, the USDA sprayed some acreage itself, including public lands. These USDA pesticide spray programs expanded significantly in the 1950s:³² Millions of acres of trees in the northeast were sprayed with DDT to kill gypsy moths.³³ In 1957, Congress approved the Fire Ant Eradication Act,³⁴ under which the USDA planned to treat 20 million acres (an area the size of South Carolina) with broad spectrum pesticides, with federal taxpayers bearing half the cost.³⁵ To rationalize the program, as Rachel Carson noted in *Silent Spring*, the USDA asserted that fire ants were a major threat to agricultural production, animals, and even human life.³⁶

31. John O. McGinnis & Michael B. Rappaport, *Supermajority Rules as a Constitutional Solution*, 40 WM. & MARY L. REV. 365, 380 (1999) (“Due to these advantages, special interest groups often secure disproportionate benefits. The power of a special interest group may enable it to persuade a majority of the legislature to support its legislation, even though a majority of voters would not support the legislation if those voters considered the issue. Observations confirm that politicians often favor legislative programs that provide concentrated benefits to a small group and diffuse their costs over the public at large”) [hereinafter MCGINNIS & RAPPAPORT].

32. BOSSO, *supra* note 20, at 81-106 is the basis of the following discussion.

33. See *Andrew Liebhold & Rose-Marie Muzika, Here Come the Gypsy Moth Brigades*, available at <http://www.sandyliebhold.com/innervoice> (last visited Sept. 5, 2002) (recounting history of gypsy moth control efforts).

34. BOSSO, *supra* note 20, at 87 (describing passage).

35. *Id.* at 87-88.

36. RACHEL CARSON, *SILENT SPRING* 162 (1962) (“In 1957 the United States Department of Agriculture launched one of the most remarkable publicity campaigns in its history. The fire ant suddenly became the target of a barrage of government releases, motion pictures, and government-inspired stories portraying it as a despoiler of

Second, the USDA directly encouraged pesticide use by funding extension service and experiment station research on pesticides, and by finding new uses for existing products. At the same time, the USDA “virtually abandon[ed] all nonchemical control research and practice” after World War II, due to the success of DDT and the other new chemicals.³⁷

Third, other USDA policies indirectly encouraged pesticide use.³⁸ For example, many price support programs operated by limiting acreage planted of a certain crop while simultaneously supporting the price. Because farmers were not limited in their ability to use fertilizer, pesticides and herbicides, they would increase chemical inputs to maximize output from the acres that were planted.³⁹ At the same time, the crop price supports also encouraged farmers to squeeze more output out of their restricted land by raising the price the farmers received for their crops.⁴⁰ Both aspects of price support programs thus encouraged increased pesticide use.

By the end of the 1950s, the federal government was providing numerous incentives for private parties to increase pesticide use, through direct and indirect, explicit and implicit subsidies. The federal government was also directly applying massive quantities of pesticides to both public and private property. Regulation of pesti-

southern agriculture and a killer of birds, livestock, and man”) [hereinafter CARSON].

37. BOSSO, *supra* note 20, at 31.

38. Pesticide use is determined by a wide range of factors, including “relative factor prices, price responsiveness, and expected returns from chemical use, government farm, conservation, and regulatory policies, technology, and pest resistance.” Noel D. Uri, *A Note on the Development and Use of Pesticides*, 204 *THE SCIENCE OF THE TOTAL ENVIRONMENT* 57, 59 (1997) [hereinafter URI].

39. See, e.g., URI, *supra* note 38, at 62 (“When planted acreage is constrained and price expectations include program payments, producers tend to substitute non-land inputs, including pesticides, to boost yields and capture higher returns on their eligible planted acreage”).

40. See BOSSO, *supra* note 20, at 28-29 (describing farm programs impact on pesticide demand); John K. Hosemann, *Agriculture and the Environment: A Thirty Year Restrospective in ENVIRONMENTAL POLICY AND AGRICULTURE: CONFLICTS, PROSPECTS & IMPLICATIONS* (Roger Meiners & Bruce Yandle eds., forthcoming 2003).

cide use was minimal, with the federal regulator having relatively few powers and being primarily concerned with its mission of promoting agriculture.

C. The Rise of Conflict

As pesticide use increased, it spread beyond the early, noncontroversial applications to areas where its effectiveness and usefulness was less clear. Soldiers facing debilitating bouts of malaria while fighting their way across the South Pacific, for example, probably would have been happy to see planes spraying DDT even if they had the chance to read *Silent Spring* first. Since the book would not be written for more than a decade, however, all they knew was that the spray planes brought relief from mosquitoes at no apparent cost to them. As pesticides became more widely used, however, the uses expanded and the new uses were less clearly beneficial and the costs of pesticide use became more apparent. At the same time, increased use also increased understanding of pesticides' impact on the environment, making the costs of use even more apparent. By the end of the 1950s, government spray programs began to provoke some public opposition and both federal and state governments began to restrict some of the uses of certain chemicals, including DDT.⁴¹

One reason for the change was that some of the new applications caused unintended side effects for non-target species. These effects often came about because the USDA knew relatively little about the effects of widespread dispersion of many of the chemicals it promoted and subsidized. This ignorance resulted from the political dynamic of public funding for research: Members of Congress receive political credit for, and so direct funds toward, providing services such as spraying. Background research needed to understand the environmental impacts of the programs, on the other hand, earned legislators little political credit with constituents.⁴² Moreover, be-

41. See LIPPKE, *supra* note 15, at 5 (noting that USDA began to phase out DDT use in 1958 and that the Secretary of the Interior issued restrictions on DDT use on public lands in 1964).

42. For example, former U.S. Senator William Proxmire (D. Wisc.) regularly awarded "Golden Fleece Awards" to agencies that he viewed as wasting taxpayer's money. These often included scientific research grants. See, e.g., Taxpayers for Common Sense, The Golden Fleece Award, available at

cause federal regulation preempted much state regulation, it had the effect of discouraging states and localities from attempting to control pesticide use to limit local environmental impacts. The politics of the regulatory structure thus discouraged investment in understanding the impacts of the spray programs and increased chemical use, which led to overuse.⁴³ Importantly, when spraying caused harm to private interests, for example when it harmed wildlife and domestic animals, the USDA was not required to fully compensate the owners of the damaged resources⁴⁴ and therefore failed to consider the full costs of the spraying.

Spraying pesticides on a widespread basis to target more marginal threats began to reveal some of the problems through experience however, as reports of wildlife and domestic animal deaths surfaced. For example, after a veterinarian in Georgia reported that over 100 cattle died after one USDA aerial bombardment of Dieldrin, farmers across the south increasingly refused to pay for spraying.⁴⁵ Even in Alabama, where fire ants had first appeared via the Port of Mobile and where people were familiar with the problems the ants posed, the legislature withdrew funding for spraying in 1959, after state game officials estimated that up to 75 percent of the state's wildlife could be eliminated by the spraying program.⁴⁶

<http://www.taxpayer.net/awards/goldenfleece/history.htm> (last visited Sept. 5, 2002) (describing history of award and listing recipients, including multiple awards for scientific research).

43. Moreover, although it seems obvious now that spraying pesticides over tens of thousands of acres would surely have at least the potential for significant environmental impacts, it was less obvious in the 1950s. It is important to keep in mind that bureaucrats, politicians, environmentalists, and chemical companies had far less reason to suspect that pesticide use was causing problems then than they would today.

44. Wildlife, for example, is "unowned" and so there is no owner to seek compensation. Owners of domesticated animals would have to prove causation to receive compensation. Where the government sprayers did not comply with rules requiring them to register with local authorities, this could be difficult. *See* CARSON, *supra* note 36, at 146. Limited scientific knowledge could also make proving harm difficult as well.

45. BOSSO, *supra* note 20, at 102.

46. *Id.*

The USDA's immediate solutions to the drop in public support were to lower the price of participation by offering the chemicals for free to those who would take them,⁴⁷ and simply continuing to spray in some areas without state or farmer input. A constituency now existed within the USDA to continue eradication programs even with lessened public support: the USDA employees whose jobs were to implement these programs and the USDA officials whose institutional and political prestige were tied to the programs' success. Such a reaction is the result of well-intentioned individuals pursuing their conception of the public welfare; there is no need to assume bad motives for the USDA employees who undoubtedly believed they were ridding the nation of dangerous pests. The growing opposition took its toll, however, by reducing the political benefits of supporting direct expenditures on spray programs and the federal spray programs gradually wound down. Nevertheless, the indirect incentives for increased pesticide use remained, continuing to encourage farmers to use pesticides.

A second reason for the development of public opposition was several scares concerning pesticide residues on food. Growers have long worried about public reaction to negative publicity about food contaminants.⁴⁸ One means of addressing the problem was to test products to certify the absence of harmful amounts of residues. Producers of products who conducted testing had an interest in shifting those costs to the public. For example, Beech-Nut, a baby-food maker, complained in the early 1950s about the cost it incurred from

47. *Id.*

48. Because many early pesticides were acutely toxic (arsenic), residues on foods have been a public concern for many years. In 1891 a scare about a fungicide used on grapes caused lurid headlines in the *New York Times* and other papers. Public health authorities destroyed grapes and consumption dropped as consumers avoided them. Analysis by the USDA showed that "an adult would have to eat 300 pounds of grapes a day, including heavily coated stems, to get a harmful dose." DUNLAP, *supra* note 14, at 41. The scare went away, but growers remembered the consequences. When a similar situation arose in England in 1925, with respect to fruit imported from the U.S., growers hired independent chemists to inspect their products and assure the public that the fruit was safe.

testing for insecticide residues and lobbied for regulations to limit pesticides in agricultural products.⁴⁹

A major public scare about residues and improper use of chemicals came with the cranberry crisis of 1959. In early November 1959 the Secretary of HEW announced that cranberries were contaminated with aminotriazole, a USDA registered herbicide, which the FDA said caused cancer in lab rats.⁵⁰ Cranberry sales dropped just before Thanksgiving, the critical market period, and sales were halted in some states. The USDA sputtered that there was no real threat; and both major party presidential candidates Nixon and Kennedy publicly ate cranberries to demonstrate that they were safe, but sales still collapsed to one-third their normal level.⁵¹ The damage to the cranberry market eventually passed but the scare left heightened public awareness that agricultural sprays might not be as beneficial as had been touted.

Thus, by the end of the 1950s, public opposition towards pesticide use had appeared. Two events during the 1960s proved critical to the development of the next phase of pesticide policy. First, the USDA had an ongoing gypsy moth eradication program in New York state. When the USDA began the program, millions of acres in eastern New York, including Long Island, were subject to massive aerial spraying in the mid-1950s. DDT was mixed with oil, so it would stick to the trees, and blanketed the area.⁵² No other effective control chemical had been discovered and the gypsy moth was a serious problem in eastern forests. The goal of the program was laudatory (saving eastern forests) and the method chosen appeared to be the only reasonable solution. Even though human health was not at risk, preserving New York's forests was an important environmental goal.

Because the USDA mixed the DDT with oil, residents complained about the scum that coated cars, swimming pools, and houses. Of even greater concern were reports of large fish kills and charges that DDT, consumed by cows, would contaminate milk.⁵³ Organic farm-

49. DUNLAP, *supra* note 14, at 68.

50. BOSSO, *supra* note 20, at 98.

51. *See* BOSSO, *supra* note 20, at 98-99.

52. DUNLAP, *supra* note 14, at 87-91 (providing the basis of the following discussion).

53. *See* CARSON, *supra* note 36, at 143-145; BOSSO, *supra* note 20, at 85.

ers were angry because after their fields were sprayed, they no longer had organic crops. In 1957, Robert Cushman Murphy, an authority on birds and curator-emeritus of the Museum of Natural History, led a group of Long Island residents in filing suit against the USDA to enjoin the spraying program. Relying on common law property and tort theories, Dr. Murphy and other plaintiffs charged that the spraying program deprived them “of property and possibly lives without due process of law,” and took “their private property for public use without just compensation” and was a “trespass upon the persons and property of the plaintiffs.”⁵⁴

Murphy argued that DDT is a poison that can damage humans, animals, birds, and insects, that it made the food from gardens unsafe to eat, and that it made land unsuitable for organic cultivation.⁵⁵ He contended that there was no public emergency that could justify the spraying program, especially since no trees in Long Island were infected with gypsy moths and, even if they were, it would be best to let nature take its course.⁵⁶

In rejecting the residents’ request for injunctive relief, the trial judge reviewed the program, noting that the spray consisted of one pound of DDT per one gallon of light oil sprayed by aircraft and that there was no doubt that the spray irritated some people and damaged some wildlife.⁵⁷ Despite this, however, the judge ruled that the support of public agencies⁵⁸ for the spray program overrode the plaintiffs’ property rights. The judge found that “[s]uch a formulation of informed opinion could not be ignored ... and the research conducted by the trained staffs of both Federal and New York State departments was directed to an intelligent program designed to deal with the realities of a perplexing situation.”⁵⁹ Furthermore, USDA experts had testified that there was no evidence of illness caused by DDT.⁶⁰ Since the public benefit was great and the plaintiffs “failed to show that there was a threat of irreparable damage to them in ex-

54. *Murphy v. Benson*, 151 F. Supp. 786, 789 (E.D.N.Y. 1957).

55. *Id.* at 789-91.

56. *Id.* at 789.

57. *Id.* at 791.

58. In 1955 the National Plant Board, representing all 48 states, passed a resolution urging the USDA to eradicate the gypsy moth. *Murphy v. Benson*, 151 F. Supp. 786, 791 (E.D.N.Y. 1957).

59. *See id.* at 792.

60. *See id.*

cess of that which would probably be visited upon the community in general” from the gypsy moth, the judge refused to enjoin the program.⁶¹

Murphy was back in federal district court for the trial the following year, still trying to enjoin the spray program. This time, Murphy came armed with more evidence of dangers from DDT exposure.⁶² Again, plaintiffs argued that they had the right to not have their property sprayed because it destroyed their ability to farm organically, and it harmed beneficial insects and wildlife. The court rejected these arguments because there was testimony that injured populations of insects were soon replenished and that crops sprayed with DDT were not unfit to eat,⁶³ ignoring the preference of some people not to eat such crops. The court again dismissed the plaintiffs’ claims, holding that they really only complained of “annoyance” rather than damage.⁶⁴ The annoyance was offset by a valid exercise of government police power: “The rights of individuals are not limitless. Individuals must yield to the requirements of the public as a whole.”⁶⁵

We have the benefit of a set of notes of the 1958 trial made by a Cornell University employee and his description of the trial is helpful in understanding why the plaintiffs failed to block the spraying.⁶⁶ The plaintiffs’ counsel’s opening statement noted that the plaintiffs “are required against their will to have their property and their persons sprayed with this poison dissolved in kerosene.”⁶⁷ Defense counsel for both the state of New York and the federal government then asserted sovereign immunity as a defense.⁶⁸

The witnesses’ testimony is also revealing. The plaintiffs all testified to direct harm suffered by the spraying. Murphy, for example,

61. *See id.*

62. *Murphy v. Benson*, 164 F. Supp. 120 (E.D.N.Y. 1958).

63. *See id.* at 124-125.

64. *See id.* at 126.

65. *See id.* at 128.

66. C.C. Alexander, *Notes on DDT Case* (1958) (unpublished manuscript, on file with authors and the Cornell University Library). The author, as might be expected for a land grant university employee, was sympathetic to the spray program and the government’s position [hereinafter ALEXANDER].

67. ALEXANDER, *supra* note 66, at 1.

68. *Id.* at 2.

testified that the spraying eliminated fish he was attempting to raise in a pond on his property and killed insects and fiddler crabs and that there were no gypsy moths on his property.⁶⁹ A farmer from Westchester County testified that her spinach crop was burned by the oil in the spray, birds and fish were killed, and her horses scared.⁷⁰ A commuter testified that she was sprayed while walking to the train station.⁷¹ Another was sprayed in her yard.⁷² A farmer lost his entire ten acre pea crop.⁷³ Another had moved to the country explicitly to grow her own food for her family; instead she and her children were sprayed along with their garden.⁷⁴

Despite the plaintiffs' detailed allegations, their experts were challenged as being out of step with expert opinion. Dr. William Martin, for example, was "led to admit" on cross-examination "that out of 125,000 physicians in the United States there are only about 600" who agree with him on DDT's harmful effects.⁷⁵ Attempts to get an expert who indicated that the Public Health Service was a "very reputable" organization to testify that the PHS could make mistakes were stopped by the court.⁷⁶ Defense experts, in contrast, testified that DDT sprays and residues were safe, including a description of studies in which prisoners were fed DDT daily.⁷⁷

Testimony also established that the type of aerial spraying used could not be modified to avoid property of individuals who objected, streams, and ponds.⁷⁸ A USDA employee testified that "it would be inconvenient and expensive to eradicate gypsy moths by ground sprays, though not impossible."⁷⁹ The contracts for the aerial spraying were arranged in Washington, not on Long Island.⁸⁰

69. *Id.*

70. *Id.* at 3.

71. *Id.* at 6.

72. *Id.* at 6.

73. ALEXANDER, *supra* note 66, at 7.

74. *Id.* at 11.

75. *Id.* at 3.

76. *Id.* at 4.

77. *Id.* at 10, 11. Prisoners were also used to test anti-malarial drugs. *See* WARGO, *supra* note 7, at 35.

78. ALEXANDER, *supra* note 66, at 7.

79. *Id.* Another witness testified that ground spraying cost \$25 per acre compared to \$1 per acre for aerial spraying. *Id.* at 16.

80. ALEXANDER, *supra* note 66, at 21.

The defense's own experts, indicated that the threat from gypsy moths on Long Island also appeared minimal. The Director of the Plant Pest Control Division of the USDA, for example, testified that prior to the spraying the "infestation" on Long Island was "light and scattered."⁸¹ The plaintiffs "hammered on the point" that 600,000 acres were sprayed to deal with forty-seven foci of infestation.⁸²

After the district court rejected their arguments, the plaintiffs in *Murphy* appealed, but the Second Circuit Court of Appeals made short shrift of their argument holding that because the spraying program was over, the case was moot.⁸³ Besides, the court noted, the plaintiffs failed to prove damages.⁸⁴ The *Murphy* plaintiffs appealed to the Supreme Court, which denied certiorari. Justice William O. Douglas dissented from the denial of certiorari, arguing the issue was not moot because spraying could resume and because the damage from DDT was not well enough understood for the courts to dismiss the possibility of danger.⁸⁵

The trial record gives some insights into why the common law failed in this case. Despite direct testimony concerning harm, including tangible harm to organic crops, the courts rejected the plaintiffs' claims based on the apparently overwhelming scientific opinion marshaled by the government. Despite the minimal benefit of the spray program – which dealt with a "light and scattered" set of fewer than fifty infestation foci of gypsy moths – the government opted to spray 600,000 acres at a cost of at least \$600,000 by its own estimates at trial. Even using the government's own cost figures for ground spraying costs, the entire problem could have been avoided if those forty-seven infestation foci occupied fewer than 24,000 acres.⁸⁶ For a "light and scattered" infestation, it seems unlikely that anything close to 24,000 acres would have been infested. Thus the government chose, from Washington, to use aerial spraying for reasons of convenience and without regard to the property rights of the plaintiffs. In addition, the government paid the sprayers by the gallon, not the acre, giving them every incentive to maximize the

81. *Id.* at 12.

82. *Id.*

83. *Murphy v. Benson*, 270 F.2d 419, 420 (2d Cir. 1959).

84. *See id.*

85. *Murphy v. Benson*, 362 U.S. 929 (1960).

86. Using the \$25 per acre figure, dividing 600,000 acres by 25 yields 24,000 acres.

amount sprayed.⁸⁷ The problem for the common law was thus that the government was the defendant, not that the legal theories were lacking.

The economic explanation for the USDA's direct promotion of pesticide use is straightforward. Politicians in Congress and the managers at the USDA had an incentive to maximize the net political benefits of spraying pesticides. The first spray programs were conducted where the marginal political benefits of spraying were largest, such as controlling malaria. As the programs expanded, spraying was done in areas where the marginal benefits were smaller (e.g. gypsy moth control). Similarly, the spraying programs were first done where the marginal political costs of spraying were lowest (over swamps) and expanded into areas where the marginal political costs were increased (inhabited areas).

Even if nothing had changed, the political benefits of the spray programs' expansion would eventually have fallen below the costs of continuing to expand them, which included the opportunity cost of foregone alternative uses for the tax money spent on these spray programs. However, as the public became wary of spray programs and the programs expanded into areas with lower net benefits, the total political benefits declined and Congressional and agency support for them also fell.

In some respects this cycle is not that different from that of the introduction of a product into a new market. New products appear, are first used where the marginal value of their contribution is highest, and are gradually introduced to additional uses with lower marginal benefits until an equilibrium is reached where marginal benefit equals marginal cost. Political processes differ from markets in several important ways that have significant implications for the pesticide regulation story.

First, there is a free-rider problem in organizing to influence the USDA and Congress.⁸⁸ If the benefits of a program are divided among 100 individuals, for example, but the costs are spread over 100,000,000 taxpayers, the benefit to each individual lobbying for the program greatly exceeds the cost to each individual taxpayer. Those in favor of the program will thus have an easier time organizing to lobby for continuation of the program than those who oppose

87. CARSON, *supra* note 36, at 146.

88. See MCGINNIS & RAPPAPORT, *supra* note 31, at 378-380 for a discussion of this issue.

it. Since Congress could mandate the use of tax dollars to pay for them, spraying programs were extended beyond what would have been otherwise done by individual decision makers.

Second, political markets require action by politicians on issues of public concern. When public concern over pesticide use rose, especially after the publication of *Silent Spring*, the USDA and Congress were suddenly faced with a sharp increase in political demand for action on pesticides.⁸⁹

Third, governments do not face the same costs as private individuals. As we discuss below, private individuals who spray chemicals (or do anything else) that harm the property of another without the property owners' consent is liable for any damages caused. Had the government been held to the same standard as private parties were who engaged in spraying chemicals, as the plaintiffs in the various suits on Long Island sought to do, the government would have had to compensate those harmed by the spray programs. That compensation would have increased the cost of the program, forcing the government to consider whether or not the benefits of the program were justified by the additional costs. Since price increases cause the quantity demanded to decrease, a relationship that holds even for most government programs, there would have been less spraying as a result. But because the government was able to invoke the public good as a counterweight to those private interests, the government was not held to those standards and was not forced to make those choices.

The result of the failure of the attempts to hold the government responsible for its actions through common law tort and property suits and the public choice issues described above that promoted continuation of spray programs and other subsidies for pesticide use was that the debate over pesticides shifted to the public arena. Those opposed to the widespread use of pesticides turned to Congress and regulation to accomplish what they could not do through the court system.

89. Lippke summarizes reaction to *Silent Spring* among the public as follows: "The general public . . . believed the assertions [about DDT's dangers] verbatim, and was astounded that the government could allow such devastation to occur." LIPPKE, *supra* note 15, at 6.

D. *Environmental Concerns in Regulation & the Ban on DDT*

As the disputes over pesticide use grew more heated during the 1960s, those concerned about the issue became increasingly dissatisfied with the USDA's performance as a regulator because of its primary devotion to agricultural promotion, despite the USDA's cancellation of many of the DDT products' registrations, including all uses on fifty food crops.⁹⁰ The USDA clearly had a bias toward agriculture, but its hands were also tied by the substance of FIFRA, which until 1972 did not include environmental concerns.⁹¹ The publication of Rachel Carson's *Silent Spring* in 1962 (serialized in part in *The New Yorker* before its publication), marked the turning of the tide of popular opinion against DDT. The book was well-written, knowledgeably discussed scientific research, and painted a horrifying picture of the world that was coming if DDT use was not restricted.⁹² Released with a flood of publicity, including a favorable hour-long program on CBS and an article by Supreme Court Justice William O. Douglas in the Book-of-the-Month Club newsletter, the book was a bestseller.⁹³

Carson told her readers of a "silent spring," where no birds would sing because they would all be dead from DDT exposure. Some of Carson's assertions about the hazards of DDT were overblown,⁹⁴ but her "primary claim – that pesticides were flagrantly overused, polluting the environment to a degree that damaged wildlife and possibly threatened human health – was correct and timely."⁹⁵ By the late 1950s there was good evidence that DDT, when sprayed over large areas, could cause fish kills and bird kills, as well as the intended insect kills. By the 1960s, scientists studying birds were becoming increasingly convinced that DDT was decimating populations where it was sprayed widely. Studies of the peregrine falcon and other rap-

90. BOSSO, *supra* note 20, at 138-139 (summarizing criticisms of USDA).

91. BOSSO, *supra* note 20, at 154-55.

92. CARSON, *supra* note 36 (Carson was also a well-respected science and nature writer.)

93. MANZUR, *supra* note 19, at 53.

94. Frederick J. Stare, *Some Comments on Silent Spring*, NUTRITION REV. (January 1963) (critiquing the science of *Silent Spring*).

95. MANZUR, *supra* note 19, at 51.

tors found evidence that DDT caused a thinning of egg shells.⁹⁶ Conclusive or not, qualified scientists produced credible studies that pointed to wildlife problems stemming from extensive government use of DDT. Carson, however, did not discuss the important role DDT had played in antimalaria efforts: "Nowhere in 'Silent Spring' did Carson acknowledge that the chemical she was excoriating as a menace had, in the two previous decades, been used by malariologists to save somewhere in the vicinity of ten million lives."⁹⁷

The Environmental Defense Fund (EDF), at that time a small environmental pressure group, went on the offensive in the late 1960s with high profile law suits and campaigns that brought in a gush of revenue.⁹⁸ Taking advantage of an administrative hearing in Wisconsin, the EDF assisted a local group in getting DDT declared a water pollutant.⁹⁹ Public concern about chemicals in food and the environment was increasing. The FDA, for example, banned the sweetener cyclamate on thin evidence and was considering, with Congressional support, banning assorted other substances. Pesticides became a major issue, with the average number of articles on the subject listed in the *Readers' Guide to Periodical Literature* growing from three per year before *Silent Spring* to more than thirty per year in the three years following.¹⁰⁰ The result was an "awesome" plunge of DDT in public perception "from miracle pesticide to bird executioner."¹⁰¹

Trying to stem uninformed public concerns about health hazards and increasing political support for banning DDT, the Secretary of Health, Education, and Welfare established a commission to produce a report from the National Cancer Institute about DDT. It issued its report, a careful and thorough review of the science, in 1969.¹⁰² It noted suspicions about DDT, but found there was no firm evidence that it was carcinogenic to humans. The commission recommended

96. DUNLAP, *supra* note 14, at 137.

97. GLADWELL, *supra* note 13, at 50.

98. *See infra* note 183.

99. BOSSO, *supra* note 20, at 136-137.

100. MANZUR, *supra* note 19, at 53.

101. Richard D. Cudahy, *Coming of Age in the Environment*, 30 ENVTL. L. 15, 16 (2000).

102. U.S. Dep't of Health, Educ. and Welfare, Rep. of the Sec'y's Comm'n on Pesticides and Their Relationship to Env'tl. Health (1969).

more testing. Environmentalists attacked the report and a wide range of groups pressed to have DDT banned as a carcinogen. Smelling victory, EDF sued the USDA and was granted standing to challenge the propriety of USDA registration of DDT. The federal appeals court took the opportunity to excoriate the USDA for its clumsy handling of the matter.¹⁰³ Moving quickly by Washington standards, federal agencies backpedaled and announced that DDT use would be phased out.¹⁰⁴ Perhaps most importantly, Congress shifted responsibility for many aspects of pesticide regulation from the USDA to the new agency President Richard Nixon had just created by executive order, the Environmental Protection Agency. The Administrator of the new agency quickly announced a plan to cancel all of DDT's registrations in the United States; when several registrants protested, administrative hearings were scheduled.¹⁰⁵ Despite the recommendation of the hearing examiner that "essential uses" of DDT be continued, EPA Administrator William Ruckelshaus canceled the registrations, citing environmental concerns.¹⁰⁶

The 1972 rewrite of FIFRA refocused the statute on safety and environmental issues, although the basic structure of regulation via registration remained the same.¹⁰⁷ Although the EPA struggled for decades to reexamine existing registrations under the new criteria, the EPA moved relatively quickly to ban most of DDT's uses in the United States.¹⁰⁸ The agency also regularly refused petitions for exemptions from the cancellation of DDT's registration over the next few years.¹⁰⁹ Attention in the U.S. then turned to a campaign to end DDT's manufacture for export.¹¹⁰

103. *EDF v. Hardin*, 428 F.2d 1093 (D.C. Cir. 1970).

104. DUNLAP, *supra* note 14, at 207-11.

105. *Toward a Noisier Spring: D.C. Circuit Upholds Cancellation of DDT Registrations*, 4 ENVTL. L. REP. 10013 (1974).

106. *Id.*

107. ROGERS, *supra* note 18, at 421-425.

108. *Id.*

109. *See, e.g., EPA Denies Request for Emergency Use of DDT in Louisiana*, 5 ENVTL. L. REP. 10065 (1975). DDT was allowed to be used to stop a tussock moth infestation in the Pacific Northwest in 1974. AARON WILDAVSKY, *BUT IS IT TRUE?* 58 (1995) [hereinafter WILDAVSKY].

110. DUNLAP, *supra* note 14, at 234. *See* Michael Holley, *The EPA's Pesticide Export Policy: Why The United States Should Re-*

The new rules had an impact on pesticide production and use, as well as on the introduction of new products. New pesticides tend to be less toxic, but the increased regulatory costs (in the \$50-70 million range, with testing and application taking eleven years)¹¹¹ have also meant fewer pesticides and those that are developed are aimed at major crop markets.¹¹²

Today the scientific case against DDT is seen as ambiguous; there is no agreement among scientists that a complete ban was the appropriate outcome.¹¹³ Nonetheless, the interests of manufacturers in returning it to use in the United States have long ago vanished along with their investments in its registration and patent protection for DDT. New products, for which they had legal protection through the registration system (raising a barrier to entry for competitors) and the patent system (blocking copycat products), had replaced the now-generic DDT.

For our purposes it is not necessary to review all the details of the struggle over the cancellation of DDT's registration as a pesticide in the United States. It suffices to note the following features of that decision. First, the decision was made for the entire nation by the EPA Administrator. Second, the decision was the subject of a significant political battle. Whatever the merits, the decision was clearly made by appointees of a highly political Administration during a period in which the Administration was concerned with the political impact of environmental policy decisions in positioning itself for the 1972 presidential elections.¹¹⁴ Environmental groups today claim credit for pressuring the EPA into canceling DDT – and they are correct to do so. Third, many of the complaints about DDT

strict The Export Of Unregistered Pesticides To Developing Countries, 9 N.Y.U. ENVTL. L.J. 340 (2001) (providing a pro-regulatory account of the campaign).

111. URI, *supra* note 38, at 68.

112. URI, *supra* note 38, at 68.

113. See GEORGE M. GRAY & JOHN D. GRAHAM, *Regulating Pesticides*, in *RISK VS. RISK: TRADEOFFS IN PROTECTING HEALTH AND THE ENVIRONMENT* (John D. Graham & Jonathan Baert Wiener eds., 1995) (summarizing debate); WILDAVSKY, *supra* note 109, at 55-78 (summarizing evidence and concluding ban was not justified).

114. See Andrew P. Morriss, *The Politics of the Clean Air Act in POLITICAL ENVIRONMENTALISM* 283-284 (Terry L. Anderson ed., 2001).

and other pesticides related to their overuse, not their use. This overuse was, at least in large part, related to state and federal direct and indirect subsidies for the use of DDT and other pesticides.

E. *Summary*

To recap briefly what we described above, there have been four periods of pesticide use and regulation in the United States. In the pre-modern era, up through the discovery of modern organic pesticides (roughly World War II), pesticides were primarily acutely toxic inorganic compounds such as lead, the primary problems were related to pesticides' acute toxicity, and regulation was done by state and local governments. Pesticides were seen as dangerous but useful substances and used on a relatively limited numbers of crops.

After the discovery of broad spectrum organic pesticides, such as DDT and the organophosphates, the United States experienced a love affair with the chemical control of pests. During this "honeymoon" period pesticides were popular (use expanded greatly) in part due to government programs aimed at subsidizing and directly applying pesticides, and federal regulation began to appear, although it was often aimed at ensuring state regulators did not hinder the development of a national market in pesticides. Acute toxicity concerns declined, as the new pesticides were far safer than their predecessors.

By the end of the 1950s, however, the honeymoon was over and conflict over pesticide use began to grow. Organic farmers and homeowners objected to mandatory government sponsored aerial spraying of their properties; hunters became concerned about wild-life losses; and the general public began to fear long-term chronic environmental harms as they read popular accounts of pesticide problems in publications like Rachel Carson's best-selling *Silent Spring*. Pressure for health and environmental-based regulation of pesticides began to increase.

Finally, in response to growing concerns, the current regime developed. Regulation was shifted to the newly-created Environmental Protection Agency, specific pesticides such as DDT were banned and new controls introduced on others, and pesticides began to be viewed primarily as an environmental problem to be controlled.

Meanwhile pesticide use had undergone two parallel developments. First, governments had used the post-World War II pesticides in massive campaigns around the world aimed at solving "public good" problems. These campaigns often failed to respect private property rights, overriding them in favor of centrally-determined

definitions of the public welfare and the safety of spraying. Second, agricultural use of the new chemicals also exploded, spurred in part by the structure of government farm programs. Unlike the government programs, however, agricultural users were liable for harm they caused others. As described below in section III, those harmed brought property and tort actions and often recovered damages from agricultural misuse.

II. THE PROBLEM OF MALARIA CONTROL

Malaria is a significant public health problem today in much of the developing world.¹¹⁵ Other insect-borne diseases are also growing, including the West Nile virus.¹¹⁶ DDT is a particularly valuable weapon in the fight against these diseases. The ban on DDT use in many countries and growing international pressure to end its use and manufacture worldwide have allowed malaria to make a comeback.¹¹⁷ The worry of scientists that there was no good, less toxic, cost-effective substitute for DDT to control mosquitoes and other pests is as true today as it was three decades ago.¹¹⁸ A disease that was on the way to being vanquished has returned with a vengeance. In this section we review the current state of malaria control programs and the alternatives to DDT use.

115. See ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729 (malaria is a “plague that sickens at least 300 million and kills over one million, mainly children, in economically underdeveloped areas of the tropics each year”).

116. See, e.g., *No Spray Coalition, Inc. v. City of New York*, 2000 WL 1401458, 1 (S.D.N.Y. 2000).

117. See, e.g., Amir Attaran & Rajendra Maharaj, *DDT for Malaria Control Should Not Be Banned*, 321 *BMJ* (December 2, 2000) (noting that three years after DDT use was stopped, mosquitoes resistant to the substitute chemical appeared, malaria cases went from 4,117 in 1995 to 27,238 cases in 1999) available at <http://bmj.com/cgi/content/full/321/7273/1403> (last visited September 5, 2002).

118. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729.

A. Malaria Control

This is not a medical journal article and your authors are not scientists. Nonetheless, we must review a few facts about malaria, malaria control, and the role of various prevention measures before discussing the public policy issues.

First, it is important not to underestimate the scope of the malaria problem. Hundreds of millions suffer from malaria and millions of families lose infants to malaria – one researcher termed it the equivalent of “filling seven Boeing 747s with children, and then crashing them, every day.”¹¹⁹ Besides killing a child every thirty seconds, malaria harms even those children who survive it. Malaria victims who survive past infancy “suffer an average of six bouts each year” making it the most common reason to miss school; adult sufferers miss an average of ten working days a year.¹²⁰ Malaria is estimated to cost six southern African countries alone more than \$1,000,000 per year in direct health and productivity costs; malaria-related losses in economic growth are estimated at more than \$100 billion for Africa since 1965.¹²¹

Second, malaria control is mosquito control. The disease is transmitted by parasites through mosquito bites.¹²² Controlling malaria requires killing mosquitoes before they can transmit the parasite to humans. Treating malaria requires treatments that kill the parasites;

119. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729.

120. United Nations Children’s Fund, *Rolling Back Malaria* 4 (1999) [hereinafter UNITED NATIONS CHILDREN’S FUND]; Email from Martin Villet, Dept. of Zoology & Entomology, Rhodes University, Grahamstown, South Africa Feb. 22, 2000, 18:10:03, *Malaria Epidemic in KwaZulu-Natal and DDT: The True Facts* (2000) [hereinafter VILLET]; Malaria Foundation International, available at www.malaria.org/DDTpage.html (last visited September 5, 2002).

121. Richard Tren and Roger Bate. *When Politics Kills: Malaria and the DDT Story*, 39-40 (2001) available at <http://www.fightingmalaria.org/malaria.ps.pdf> (last visited on Sept. 5, 2002) [hereinafter TREN & BATE].

122. See Titus Bradley, *Malaria and Drug Resistance*, at <http://www.micro.msb.le.ac.uk/224/Bradley/History.html> (last visited Sept. 5, 2002) [hereinafter BRADLEY]. A good history of malaria control from an anti-DDT perspective is in WARGO, *supra* note 7, at 21-42.

unfortunately drug resistant strains of malaria are appearing.¹²³ No vaccine exists.

Third, environmental pressure groups have succeeded in making DDT unavailable for malaria control in many countries. The number of countries using DDT has been whittled down to 23 or fewer.¹²⁴ DDT is produced in only three countries and is becoming difficult to obtain. The United Nations Environment Program has put it on the hit list for extinction, seeking a global ban by treaty,¹²⁵ while conceding that DDT's usefulness against malaria requires "special attention and caution."¹²⁶

Fourth, the lack of DDT is a significant handicap in malaria control. Malaria was estimated to infect 350 million people in 1952; the infection rate had fallen by over 97 percent by 1969 as a result of DDT having been sprayed inside homes and on mosquito breeding sites.¹²⁷ But "DDT was widely discredited in the 1960s because of its harmful effects on the environment," so the disease is nearly back to where it was 50 years ago.¹²⁸ In the decades that have passed since the banning of DDT in the U.S., research on it has continued. While

123. See BRADLEY, *supra* note 122 ("Drug resistant malaria has become one of the most important problems in malaria control in recent years. Resistance in vivo has been reported to all antimalarial drugs except artemisinin and its derivatives. Drug resistance necessitates the use of drugs which are more expensive and may have dangerous side effects"), *available at* <http://www.micro.msbl.ac.uk/224/Bradley/Resistance.html> (last visited Sept. 5, 2002).

124. See *supra* note 4.

125. United Nations Env't Programme 19th Governing Council Sess., U.N. Doc. 19/13C (1997) ("international action, including a global legally binding agreement, is required to reduce the risks to human health and the environment arising from the release of the twelve specified persistent organic pollutants [including DDT].")

126. Klaus Topfer, Working Together for a POPs Treaty for the Next Millennium, Opening Remarks at the Third Session of the Intergovernmental Negotiating Committee for a Treaty on Persistent Organic Pollutants (Sept. 6, 1999), *available at* http://irptc.unep.ch/pops/POPs_Inc/INC_3/SpeechTopfer.htm (last visited Sept. 5, 2002).

127. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 6.

128. *Id.*

we are no more qualified than Rachel Carson to review the details of scientific studies about chemicals, we will try to offer the gist of the state of knowledge today. Because some nations still spray DDT to control mosquitoes, some quit and then resumed spraying, and because others quit at a certain time, data has been collected from studies around the world. A review article covering numerous studies in the British medical journal, *The Lancet*, provides the basis for this discussion.¹²⁹

When DDT spraying stops, malaria's incidence rises markedly. In the high and moderate risk regions of Columbia and Peru, for example, the risk of malaria doubled when spraying ceased in the 1990s.¹³⁰ The disease has returned to areas in which it had been eradicated: urban areas of the Amazon Basin, Korea, Armenia, Azerbaijan, and Tajikistan.¹³¹ In Sri Lanka, malaria cases fell from 2.8 million and 7,300 deaths per year before DDT spraying, to 17 cases and no deaths. When the spraying stopped in 1961, malaria jumped back to 500,000 cases by 1969,¹³² The spread of the disease means it has reappeared even in the U.S. and Europe.¹³³

DDT is not, of course, the only tool available and the malaria problem is not being ignored. An international campaign called "Roll Back Malaria" (RBM) was launched in October 1998 by UNICEF, WHO, and the World Bank to "prevent and control this centuries-old scourge."¹³⁴ Since DDT is unavailable in most nations, and international agencies are reluctant to use it even were it is legal, RBM must rely on other measures: "insecticide-treated mosquito nets, mosquito coils, repellants and other materials; early detection, containment and prevention of malaria epidemics; and strengthening of local capacity to monitor malaria in affected regions."¹³⁵ Monies are being pieced together from multiple sources for this project that has a hoped-for budget of \$1 billion per year. By early 2000, \$27 million had been collected from or pledged by various countries and interna-

129. D.R. Roberts, S. Manguin & J. Mouchet, *DDT House Spraying and Re-emerging Malaria*, 356 *THE LANCET* 330 (2000) [hereinafter ROBERTS, MANGUIN & MOUCHET].

130. *Id.*

131. *Id.*

132. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729.

133. ROBERTS, MANGUIN & MOUCHET, *supra* note 129.

134. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 1.

135. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 8.

tional agencies.¹³⁶ While that sum is trivial for the task at hand, the World Bank has promised to fund up to half the budget.¹³⁷ Other funds are solicited from governments, agencies, NGOs, and the private sector, including pharmaceutical companies that can provide drugs to relieve symptoms as well as, hopefully, invent a cure. The World Bank is spearheading this private-public partnership called "New Medicines for Malaria Venture" that is hoped to provide new medicines at prices affordable for hundreds of millions of impoverished persons.¹³⁸

Again, the problem is that these measures are simply not as effective as DDT. Even a UNICEF showcase effort in Laos instituted in 1994 reduced malaria by only 25 percent over three years.¹³⁹ The ambitious *goal* of the RBM campaign is merely to reduce infant mortality from the disease (not the incidence) by 50 percent by 2010,¹⁴⁰ a far cry from the 97 percent reduction achieved decades ago with DDT.

One major problem with alternatives is their cost. For example, the focus of RBM in malaria prevention is on the use of mosquito nets and a hope that more treatment for sufferers can be developed.¹⁴¹ People in the tropical regions of the world are expected to sleep under such nets. At a price of \$5 to \$10 each,¹⁴² nets are expensive for people in countries where per capita personal income is measured in the hundreds of dollars per year. Malaria is common in India and

136. See *Roll Back Malaria Partnership*, available at <http://mosquito.who.int> (last visited March 13, 2003).

137. *Donor Responsibilities in Rolling Back Malaria*, 356 THE LANCET 521 (2000).

138. *Roll Back Malaria Partnership: Defining the Role of the World Bank*, World Bank Africa Region Findings, No. 144 (Oct. 1999)

139. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 14.

140. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 3.

141. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 2.

142. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 3.

Brazil,¹⁴³ for example, and per capita incomes in those countries in 2000 were only \$450 and \$3,580 respectively.¹⁴⁴

Not only are the nets relatively expensive, they also require continual retreatment – soaking the nets in insecticide, which must be done by the nets' owners.¹⁴⁵ As a result, net users experience skin contact with pesticides, during net retreatment, and through to air filtered through the insecticide-impregnated nets.

The alternatives also do not appear to work as well as DDT spray programs. According to an entomologist in South Africa, certain malaria-carrying species of mosquitoes “are completely resistant to the new, softer pyrethroid insecticides that were introduced by the National Department of Health.”¹⁴⁶ While these newer, more costly, and less effective insecticides may help some, and are believed to be less toxic to birds than DDT, they have not been subject to as much study as DDT and so they may pose other environmental problems yet unknown.

Substituting the nets for DDT use clearly does reduce exposure to DDT, but increases exposure for many people to malaria-carrying insects (because the nets are less effective) and to whatever insecticide is used in treating the nets. Substituting other chemicals for DDT in spray programs subjects individuals in the sprayed areas to the risks of those other chemicals; it does not eliminate all health risks. Banning DDT denies these people, who are predominately poor residents of developing countries, the choice between those risks and the risks of DDT. In effect, the ban on DDT substitutes RBM, a more expensive and less effective program with a different (and not necessarily smaller) set of risks, for the use of DDT. Indeed, some scientists assert that the insistence of “rich countries” that malaria-infected countries “do without DDT is ‘eco-colonialism’ that can impoverish no less than the imperial colonialism of the past did.”¹⁴⁷

143. See Titus Bradley, *History and Distribution*, at <http://www-micro.msb.le.ac.uk/224/Bradley/History.html> (last visited Sept. 5, 2002).

144. See World Bank, *Data & Statistics*, available at http://www.worldbank.org/data/databytopic/sas_wdi.pdf (last visited Sept. 5, 2002).

145. UNITED NATIONS CHILDREN'S FUND, *supra* note 120, at 3.

146. VILLET, *supra* note 120.

147. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 730.

As might be expected, in regions where malaria is a scourge, people question the viability and morality of RBM when a proven cost-effective malaria-control product, DDT, already exists. Delegates to the WHO “Regional Consultation to Prepare African Countries Towards Reduction on Reliance on DDT for Malaria Control” in Harare, Zimbabwe in 2000, for example, issued a statement expressing the “deep concerns of the participating member states on the possible economic and health implications of any restriction made on DDT use for malaria control.”¹⁴⁸ In short, the delegates noted that no cost-effective or proven alternatives that are less toxic than DDT exist to replace it.¹⁴⁹

DDT effectiveness with regard to eliminating mosquitoes has never been the main issue. The key questions concern long-term toxicity and environmental damage. There are two important facts to consider in examining those costs. First, the evidence shows that “toxicity of DDT in human beings and effects on the environment are questionable and require further investigation” and that “claims of risks of DDT to human health and the environment have not been confirmed by replicated scientific inquiry.”¹⁵⁰ Further, the evidence indicates that, when DDT is properly applied, mosquitoes do not become resistant to DDT, a benefit that is not enjoyed by most alternative sprays.¹⁵¹ The environmental costs of DDT use are thus far smaller than was believed in the 1960s and early 1970s, when continued DDT use was predicted to be leading to an environmental catastrophe. One indication of this is the public letter signed in 2000 by hundreds of independent scientists, including three Nobel-laureates in medicine, advocating the use of DDT in malaria control.¹⁵²

Second, the means of applying pesticides generally, and DDT in malaria control in particular, have changed since the 1950s. One reason DDT appeared to be so harmful in the 1950s and 1960s was due

148. *Delegates' Report, Regional Consultation To Prepare African Countries Towards Reduction Of Reliance On DDT For Malaria Control*, Feb. 2000, available at <http://www.malaria.org/ddtreduceaf.html> (last visited Sept. 5, 2002).

149. *Id.*

150. ROBERTS, MANGUIN & MOUCHET, *supra* note 129, at 330.

151. VILLET, *supra* note 120.

152. *Caution Required with the Precautionary Principle*, 356 THE LANCET 265 (2000).

to its widespread use in heavy dosages, mostly from government spray campaigns, but also from overuse by private sprayers who had not learned proper application techniques. Heavy doses can cause acute effects in birds, fish, and other wildlife. "The fault for this lies in the massive agricultural use of DDT. Dusting a single 100-hectare cotton field, for example, can require more than 1,200 kg of DDT over 4 weeks."¹⁵³ Even if DDT is sprayed from the air for mosquitoes, the volume and frequency used today is far less than common agricultural practices of earlier years.¹⁵⁴ Importantly, however, aerial spraying for mosquitoes is not needed for DDT to provide significant protection to people against mosquitoes:

The current practice is to spray the interior surfaces only of houses at risk, leaving a residue of DDT at a concentration of 2 g/m² on the walls, ceiling and eaves, once or twice a year. Half a kilogram can treat a large house and protect all its inhabitants. Doubtless some fraction of this escapes to the outdoors, but even assuming it all did, the environmental effect is just 0.04% of the effect of spraying a cotton field. Guyana's entire high-risk population for malaria can be protected with the DDT that might otherwise be sprayed on 0.4 km² of cotton in a season.¹⁵⁵

153. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729.

154. *See generally* GLADWELL, *supra* note 13, at 50.

155. ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 729.

Indoor spraying works as follows:

"Mosquitoes after biting a human being, with some exceptions have to rest on the indoor surface, which would be treated with DDT. DDT may not instantly kill the mosquitoes but would shorten the life of the mosquitoes to such an extent, which will not be enough for the sexual form of malaria parasites in the stomach of the mosquitoes to develop into infective asexual forms of parasite. The long life of DDT on the surface would ensure that such interruptions of transmission continued for a long time. No other determinants of malaria transmission were as potent as the longevity after biting the human being and no other was so amenable to human actions as this one."

See also Anil Patel, *Forward in* TREN AND BATE, *supra* note 121, at vii. Indoor spraying was already a crucial part of the antimalaria campaign by the 1950s. GLADWELL, *supra* note 13, at 50.

In sum, malaria is a significant public health problem. Effective control of malaria is not possible at this time without the use of DDT. That use imposes far fewer environmental and other costs than previously thought and has been endorsed by large numbers of public health experts. Why, then, is the campaign to ban DDT not only continuing but succeeding?

B. *Green Politics, Dead Children*

There is no question that DDT use is opposed by major environmental pressure organizations in the United States and internationally. Greenpeace sponsors protests at the few factories in nations where DDT is still produced.¹⁵⁶ The World Wildlife Federation is also pushing to eliminate all use of DDT.¹⁵⁷ “[E]nvironmentalists are still seeking a global ban, arguing that if DDT is produced for use in improving public health, it will also be used for agriculture and lead to global pollution of the environment.”¹⁵⁸ A recent book on pesticides analogized DDT to nuclear explosions.¹⁵⁹

Banning the use of an inexpensive, safe solution for a global health crisis takes more than political organizations opposed to the solution on ideological grounds, however. The moral argument in favor of trading lives lost or injured due to malaria to prevent somewhat speculative environmental harms is, to say the least, challenging to

156. Roger Bate, *Without DDT, Malaria Bites Back*, SPIKED SCIENCE (April 24, 2001) available at <http://www.spiked-online.com/Articles/000000005591.htm> (last visited September 5, 2002) (“Despite the evidence, Greenpeace militants have been protesting to close down DDT’s only major production facility in the world, in Cochin, India.”)

157. TREN & BATE, *supra* note 121.

158. D.R. Roberts, S. Manguin & J. Mouchet, *DDT House Spraying and Re-emerging Malaria*, 356 *THE LANCET* 330, 331 (2000).

159. See WARGO, *supra* note 7, at 299 (concluding that “[p]hotographs of children frolicking in mists of DDT” and “of sailors shielding their eyes from nearby aboveground atomic bomb explosions in the South Pacific at mid-century” show comparable problems: “[b]oth technologies caused global contamination of the food supply, placing every human at risk. . .”).

articulate.¹⁶⁰ There are a number of interest groups that benefit from restricting or eliminating DDT use.

First on the list are the manufacturers of substitute pesticides. Recall that other chemicals present two problems: they are more expensive and often more toxic. Alternatives costs two to four times as much as DDT.¹⁶¹ That higher cost, an entomologist at the EPA asserts, is likely to lead many countries to abandon house spraying altogether.¹⁶²

In any event, chemical companies are no doubt pleased to supply more costly and less effective chemicals in lieu of cheap, generic DDT. The “insistence of environmental advocacy seems to have won approval of powerful pesticide companies because it allows them to sell their more expensive insecticides. The replacement of DDT by organophosphate, carbamate, or pyrethroid insecticides is commonly proposed even though price, efficacy, duration or effectiveness, and

160. See, e.g., Christopher H. Schroeder, *Rights Against Risks*, 86 COLUM. L. REV. 495, 517-518 (1986) (describing and critiquing pro-ban position as putting “far too much weight on the distinction between actions and nonactions.”). Those authors who claim a moral justification for imposing American attitudes on other nations often simply fail to acknowledge that pesticides like DDT could have legitimate uses in developing nations. See, e.g., Michael Holley, *The EPA’s Pesticide Export Policy: Why the United States Should Restrict the Export of Unregistered Pesticides to Developing Countries*, 9 N.Y.U. ENVTL. L.J. 340, 341 (2001) (ignoring the malaria issue entirely and stating simply that “it is commonly understood that developing countries are allowing the import of unregistered pesticides only because they, unlike the developed countries that produce those pesticides, lack a regulatory infrastructure that would allow them to make sound risk/benefit analyses regarding the use of such products”).

161. Roger Thurow, *In Malaria War, South Africa Turns to Pesticide Long Banned in the West*, WALL ST. J., July 26, 2001, at A1 (noting DDT costs about one cent per square yard of coverage compared to almost two cents per square yard for cheapest alternative and about four cents per square yard for carbamates.); ATTARAN, ROBERTS, CURTIS & KILAMA, *supra* note 1, at 730.

162. Sheryl Gay Stolberg, *DDT, Target of Global Ban, Finds Defenders in Experts on Malaria*, N.Y. TIMES, Aug. 29, 1999, at A1.

side-effects (e.g. an unpleasant smell), are major barriers to use in poor countries”¹⁶³

Second, international aid organizations, such as the World Bank, UNICEF, WHO and other international government agencies, have reasons to prefer complex and less effective programs like RBM to DDT use. One reason is that these organizations are simply not needed in the area of malaria control without a DDT ban. DDT is cheap and simple. Without DDT, malaria is a global tragedy that easily justifies a billion-dollar-a-year budget for RBM, a program likely to become a permanent feature so long as DDT is outlawed. The plague will never go away and so the control programs will be permanent. The problem may be made smaller and less tragic, but a permanent program will only put a dent in a persistent problem that was near extinction three decades ago. Note that such incentives can affect agency behavior even if the officials in the agency are not consciously pursuing such a strategy.

Not only does the permanent existence of a program benefit the bureaucrats who work for the program, organizations like the World Bank benefit from participation in these programs, in that programs like RBM help burnish the organizations’ environmental credentials. RBM will have only limited success, even if it meets its goals. Surprisingly, this does not irritate environmental organizations, who indeed applaud the use of mosquito nets rather than DDT. The World Bank, for example, is routinely blasted (with good reason) by environmentalists for supporting programs that are environmentally (and economically) destructive.¹⁶⁴ RBM gives the Bank a public health role that is hard to criticize, one with a plausible impact on economic development (sick people cannot work as well as healthy people). This helps the World Bank make peace with its environmental critics, yet justify its continued existence for years to come.¹⁶⁵

163. ROBERTS, MANGUIN, & MOUCHET, *supra* note 129, at 331.

164. See Matthew Brown, *Banking on Disaster: The World Bank and Environmental Destruction in GOVERNMENT VERSUS THE ENVIRONMENT* (Donald R. Leal & Roger E. Meiners eds., 2001).

165. The World Bank is not alone among agencies that have changed their agenda. As Terry Anderson and others have documented in *The Greening of Foreign Policy*, a host of federal agencies have, with the waning of the cold war in particular, turned into agencies with environmental agendas or, at least, agendas that will not

Third, because the alternatives to DDT are so ineffective, the long term focus must be on developing a vaccine. While there is nothing on the immediate horizon, drug companies and other researchers are happy to accept funds from government agencies to work on the project, creating another group with a vested interest in continuing the status quo.

Fourth, the major environmental pressure groups have important interests in fighting a return of DDT. The initial ban on DDT remains an important symbolic victory for environmental pressure groups. The fight over DDT was bitter¹⁶⁶ and a major triumph for the new environmental movement. Indeed, the Environmental Defense Fund, one of the most effective groups, grew out of the initial campaign against DDT spraying on Long Island¹⁶⁷ and continues to highlight its role in the DDT ban in fund-raising appeals to this day. Conceding that they were wrong on DDT would cause the groups to lose an important fundraising and public relations symbol. On the

offend the politically potent environmental organizations. To survive without old enemies to fight, they need new friends. *See The Greening of U.S. Foreign Policy* (Terry L. Anderson & Henry I. Miller eds., 2000).

166. Just one example of how bitter is revealed in *Edwards v. Nat'l Audubon Soc'y*, 423 F. Supp. 516 (S.D.N.Y. 1976), *rev'd*, 566 F.2d 113 (2d Cir.), *cert. denied*, 423 U.S. 1002 (1977). As part of the national debate, the proponents of DDT argued that the Society's annual bird count showed increasing bird populations. Robert S. Arbib, Jr., an editor of the Count, claimed that this misrepresented the Count, since the increase in birds was due to more people participating in the Count. Anyone who asserted otherwise, he said, was "being paid to lie." A *New York Times* reporter then asked Arbib for the names of the "paid liars" and Arbib gave him a list of five scientists. After the *Times* reported on the allegation that the scientists were lying, three sued the Audubon Society and the *Times* for defamation. Although they won at trial, the verdict was reversed on appeal. *Id.*

167. *See* Environmental Defense, *About Environmental Defense*, at <http://www.environmentaldefense.org/aboutus.cfm?subnav=aboutus> (last visited September 5, 2002) ("A generation ago, Environmental Defense helped launch the modern environmental movement by winning a ban on the pesticide DDT, thus showing how a handful of individuals can use science and the law to bring about national reform.").

other hand, environmental groups face no responsibility for the consequence of millions of babies dying and hundreds of millions suffering. The cost of their position is born overseas, among poor countries where they have few, if any, members and by people their members are unlikely to meet.¹⁶⁸

Finally, malaria (or at least malaria in poor developing countries) is apparently not interesting enough to attract media attention in the United States. For example, while we hear much in the media about AIDS in Africa, we hear much less about the malaria epidemic.¹⁶⁹

C. Summary

Malaria and other insect-borne diseases are susceptible to control through a cheap and effective means. That control strategy requires the use of DDT, a chemical with potent symbolic importance to domestic American political pressure groups. As a result, the United States has acquiesced in the elimination of this strategy, resulting in millions of additional cases of malaria and deaths.

III. PESTICIDES & COMMON LAW ENVIRONMENTALISM

As Dr. Murphy argued to the federal courts in his original suit against spraying on Long Island, nonconsensual spraying is trespass. Property owners had a common law right not to have their property invaded by a substance they believed to be damaging to the vegetation and wildlife on the property. If upheld, Murphy's theory would have prevented much of the overuse of pesticides in the mass spraying programs promoted by the USDA and other agencies during the 1950s and 1960s. (Of course, individual landowners could have misused DDT or other chemicals on their own land.) And, in many

168. See Frank B. Cross, *Paradoxical Perils of the Precautionary Principle*, 53 WASH. & LEE L. REV. 851, 890-91 (1996) (“[T]he United States has been fortunate to feel few of the foregone health benefits from DDT use, but the worldwide impact was immense.”).

169. For example, a search in the ALLNEWS database on Westlaw turned up more than 10,000 hits (the maximum number Westlaw will display) for stories on “Africa /s AIDS” after January 1, 2001 but only 1336 for “Africa /s malaria” for the same period. Using the period after January 1, 2002 searches found 4,966 and 507, respectively.

cases, courts relied on common law property and tort theories to order compensation for unwanted pesticide spraying by private individuals, primarily in cases where chemicals applied to one landowner's property drifted across the border and caused harm to a neighbor's land. In this section we explore how the courts dealt with pesticide cases between private parties and offer an explanation of why the theories failed to adequately handle the larger problems together with a remedy that would enable them to do so. We then examine the difference between centralized and decentralized decision making, concluding that decentralized decision making offers a superior means of handling pesticide issues.

A. Pesticides in the Courts

The fact that individuals are responsible to pay damages for spraying pesticides carelessly, and inflicting injury on the property of another, has long been the rule of law: "common law tort theories imposing liability for crop, livestock and personal damages on those responsible for creating the pesticide drift should be understood as social efforts to internalize those external costs by making the polluter pay."¹⁷⁰

Cases from the 1950s concerning agricultural spraying of pesticides show that the general rule was that a farmer and a sprayer he or she hired could be held liable for spray that was accidentally dumped on a neighbor's property or drifted on to a neighbor's property and did damage to crops, livestock, or persons.¹⁷¹ No bad intention needed to be proven, and usually did not exist.¹⁷² Drift was usually the result of attempts to save on effort and manpower in reducing the precision of application or failing to wait for wind conditions to be optimal, not the result of a desire to waste money by dumping spray on the property of another or distributing the pesticide under windy conditions. Quite a number of cases concern spray that drifted and

170. Robert F. Blomquist, *Applying Pesticides: Toward Reconceptualizing Liability to Neighbors for Crop, Livestock and Personal Damages from Agricultural Chemical Drift*, 48 OKLA. L. REV. 393, 397 (1995).

171. *See, e.g.*, *Crouse v. Wilbur-Ellis Co.*, 272 P.2d 352 (Ariz. 1954).

172. *See, e.g.*, *Faire v. Burke*, 252 S.W.2d 289 (Mo. 1952).

killed bees. In such cases, liability was regularly imposed.¹⁷³ Other cases concerned spray that caused dairy milk to be contaminated with unacceptable levels of pesticide.¹⁷⁴ If one was careless and sprayed too much because directions from the manufacturer were not followed the action rose to the level of negligence per se.¹⁷⁵ Contrary to what happened to the organic growers on Long Island whose crops were sprayed with DDT, farmers have won cases for having their crops damaged by pesticide sprays from neighboring farmers that made them ineligible for "organic" certification, even though the level of pesticides on the crops was within federal standards for human consumption.¹⁷⁶

Courts have upheld a variety of theories applied to pesticide drift cases. Some states have allowed strict liability claims, applying the maxim that "one must use his own rights as not to infringe upon the rights of another."¹⁷⁷ Courts have also relied on the determination that aerial application of pesticides is an abnormally dangerous activity to justify strict liability.¹⁷⁸ Manufacturers of pesticides have also been held liable for drift damage on strict liability grounds.¹⁷⁹ Other theories successfully used have included nuisance¹⁸⁰ and trespass.¹⁸¹ The predominant theory, however, has been negligence.¹⁸²

173. *See, e.g.*, *Lundberg v. Bolon*, 194 P.2d 454 (Ariz. 1948).

174. *See, e.g.*, *Smith v. Okerson*, 73 A.2d 857 (N.J. Sup. Ct. 1950).

175. *See, e.g.*, *Bennett v. Larsen*, 348 N.W.2d 540 (Wis. 1984).

176. *See, e.g.*, *Langan v. Valicopters, Inc.*, 567 P.2d 218 (Wash. 1977).

177. *Young v. Darter*, 363 P.2d 829, 832 (Okla. 1961). *See also* *Gotreaux v. Gary*, 94 So.2d 293 (La. 1957) (applying maxim "sic utere tuo ut alienum non laedas" or that property owners have a right to improve their land but may not do so in a manner that infringes on the rights of others).

178. *See, e.g.*, *Langan*, 567 P.2d at 221.

179. *See, e.g.*, *Chapman Chem. Co. v. Taylor*, 222 S.W.2d 820, 827 (Ark. 1949).

180. *See, e.g.*, *Gainey v. Folkman*, 114 F. Supp. 238 (D. Ariz. 1953).

181. *See, e.g.*, *Alm v. Johnson*, 275 P.2d 959 (Idaho 1954).

182. *See, e.g.*, *S.A. Gerrard Co. v. Fricker*, 27 P.2d 678, 680 (Ariz. 1933); *Hammond Ranch Corp. v. Dodson*, 136 S.W.2d 484, 487 (Ark. 1940); *McKennon v. Jones*, 244 S.W.2d 138, 140 (Ark. 1951);

Given the success in using common law theories, both before and after the DDT debate, why were the Long Island plaintiffs unable to use them to block the DDT spraying?¹⁸³ The answer is simple: The plaintiffs sought to restrain the government, not private parties. The plaintiffs could have won injunctive relief against a private party who chartered a plane and sprayed even a harmless substance on the plaintiffs' land. But compared to the "public interest," as articulated by the federal government, the plaintiffs could not hope to prevail without more dramatic harm. Since federal programs generally override property rights and common law protections, the battle over pesticides had to be played out in the public and political arena. Government agencies also avoided liability in this period for conduct for which nongovernmental entities would be held liable under the doctrine of sovereign immunity.¹⁸⁴

The common law failed in addressing the DDT spraying because it was never given a chance to be applied. As a result, the debate about DDT has been an all or nothing debate. In the next section we com-

Kennedy v. Clayton, 227 S.W.2d 934 (Ark. 1950); Heeb v. Prysock, 245 S.W.2d 577 (Ark. 1952).

183. The same issue arose again in state court in New York in 1967. This time, the newly formed Environmental Defense Fund (EDF), which was formed that year largely due to the DDT issue, was behind a suit to try to enjoin spraying government spraying of DDT to control mosquitos on Long Island. DUNLAP, *supra* note 14, at 142-200 discusses this history. Perhaps being more savvy politically, the plaintiff did not argue on the basis of trespass or takings, but proposed a theory that they had the right to enjoin actions that adversely affects natural resources. Yannacone v. Dennison, 285 N.Y.S.2d 476 (N.Y. Sup. Ct. 1967). That novel argument had no basis in common law or statutory law, so no injunction was issued, but plaintiffs were well aware that the issue was moving to the political level, so impact on the media may have the most real purpose of this and similar suits brought by the new organization. Coverage of such litigation added to the drum beat against DDT that was very public after publication of *Silent Spring* in 1962. The product was not long for the market.

184. See, e.g., Neff. v. Imperial Irrigation Dist., 299 P.2d 359 (Cal. App. 1956); Rabin v. Lakeworth Drainage Dist., 82 So. 2d 353 (Fla. 1955).

pare the decision making apparatus of the common law with that of centralized regulation schemes.

The importance of the government spraying programs in sparking the debate over DDT is now largely ignored. For example, one of the major opponents of DDT use in the Senate, Wisconsin Senator Gaylord Nelson, recalled in a 1995 interview how he developed his opposition to DDT:

“DDT was very popular in most of the cities, including wealthy suburbs. The governor’s residence was in the rich suburb of Maple Bluff on Lake Mendota, looking across the lake to the capital. Big trucks would go around and fog the whole area with DDT. Well, you didn’t have to be a scientist to recognize that this was goofy. They were killing mosquitoes, but it was a potent agent affecting birds and every other insect –valuable insects, worms, everything. I just felt that was a crazy idea. In any event, by the time I was elected to the U.S. Senate and came to Washington in 1963, I had read Rachel Carson’s book, *Silent Spring*. Then I introduced the first legislation in the Senate to ban the use of DDT.”¹⁸⁵

Note what Nelson does not say. He does not say that he took action to stop the government’s overspraying. Rather, the government’s overspray motivated him to work to prevent anyone from using DDT.

Similarly, the history of DDT’s use has been ignored in the academic literature. For example, Prof. Terry Frazier summarized this experience with DDT as follows:

“Adapting old rules to fit new conflicts also means that we must be prepared to rethink and amend some rules as our scientific understanding of cause and effect relationships involving resource consumption grows. For example, consider the history of our society’s use of DDT as a pesticide. Use of DDT in the South Pacific during World War II saved countless lives that otherwise would have been lost to malaria. Postwar use of DDT led to greater agricultural production and relatively pest-free urban comforts. Yet scientific study of the cumulative public health affects of DDT use revealed a potential human and

185. Milo Mason, *Interview: Gaylord Nelson*, NAT. RESOURCES & ENV’T 72, 73-74 (1995).

ecological disaster by the late 1960s and early 1970s. Property owners who were free to use DDT to control pests on their land in the early 1960s no longer could use the chemical in its pure form by the early 1970s. One of the most important lessons of our experience with DDT should be that our property rules must leave room to adapt to changes in what we know about the web of ecological relationships that bind us to every other component of our environment.”¹⁸⁶

A reader of Frazier’s account would think that the government’s role in the saga was entirely a protector of the common good, while private property owners sprayed their land indiscriminately. In fact, as we have shown above, precisely the opposite was the case with DDT – private property owners objected to government spraying programs, not the reverse.

Of course, one objection to the use of DDT was that it bioaccumulated in the environment.¹⁸⁷ Could markets and the courts have addressed this issue through market forces and the common law? We believe so for three reasons. First, bioaccumulation is greatly increased by inefficient delivery mechanisms, such as aerial spraying, where much of the active ingredient does not reach the target pest. Such methods are also the most likely to produce immediate external effects, such as drift, since methods that deliver more of the active ingredient to pests are less likely to accidentally deliver active ingredient to non-target species. The common law doctrines of negligence, trespass, and strict liability thus provide an incentive to avoid inefficiencies in delivery, as does the cost of the product. They would therefore tend to reduce the opportunities for bioaccumulation.

186. Terry W. Frazier, *Protecting Ecological Integrity Within the Balancing Function of Property Law*, 28 ENVTL. L. 53, 99-100 (1998).

187. See, e.g., WWF Press Release, *Three Decades After Silent Spring, DDT Still Menacing the Environment* (June 30, 1998) at http://www.panda.org/news/press/archive/news_219.htm (last visited September 5, 2002) (“Because DDT can travel long distances and accumulate in the body, millions of humans and animals worldwide have buildups of the chemical in their tissue, even though it may have been produced on another continent”).

Second, the early modern pesticides such as DDT were extremely broad spectrum pesticides. As a result, these chemicals affected a wide range of species. Succeeding generations of pesticides have been more narrowly targeted to specific pests, reducing the risk of bioaccumulation and reducing the risk of common law liability (e.g. for killing bees). In the absence of product market regulation that slows innovation, as the pesticide registration system does by extending existing products' market life by restricting the entry of competitors, the effect of competitive product markets would likely have produced a shift toward less harmful products even without a specific market demand for such products. Combined with a demand for "safe" and "environmentally friendly" products, which can be found in stores today, the shift would have occurred even faster.

Third, in the absence of government incentives, both direct and indirect, for pesticide use (such as government-funded spray programs and farm price supports), pesticide use would be substantially less, further reducing the problem of the long-term presence of pesticides in the environment. Moreover, had governments been required to pay for the damage they caused, government spray campaigns would have been conducted differently and less frequently.

Would these factors have completely dealt with every instance of harm caused by pesticides to either the environment or individuals? Of course not. We argue merely that they would have dealt with these harms better than the alternative of centrally-directed spraying and chemical use promotion succeeded by attempts to restrict the use of chemicals for reasons we discuss below.

B. *Centralization vs. Decentralization*

Pesticide regulation today in the United States is a paradigm case of central planning. Each product must be registered with the EPA, and registration decisions are supposed to give government experts the opportunity to examine the labels, application procedures, side-effects, environmental impacts, and human health effects of the products. Only those that meet the regulator's criteria for striking the proper balance are allowed to be sold. Moreover, federal, state, and local governments regularly make decisions about when to apply pesticides, just as they did in the more extensive spraying operations of the 1950s and 1960s.

These decisions both have the most important characteristic of decisions made through the political process: the winner takes all. Either a product is allowed or it is not. Either we all get sprayed

through government spraying problems or no one gets sprayed. Either we all pay, via our taxes, for spraying or no one may pay. That tends to be the nature of political decisions – winners get more than what they are willing to pay for; losers are denied what they prefer and must contribute to fund the other side.

Markets and the common law, on the other hand, generally make decisions at the margin: Farmer Jones decides if it is worth buying some spray, and, if so, how much will work for her. If Farmer Jones sprays, some molecules of spray may drift on to her neighbor's property; if she sprays too much, it will rise to the level of actionable damage and she will pay for her carelessness in violating her obligation to protect her neighbor from her actions. Markets provide an incentive to conserve on inputs. Massive aerial spraying of pesticides for mosquito control has given way to more sophisticated, and cheaper, delivery mechanisms such as the use of house-spraying described earlier in part because the latter is cheaper.

Consider three key distinctions between market and common law decisions and centralized regulatory decisions:

- Regulators depend on centralized collection and processing of knowledge, inevitably losing the benefits of local knowledge. Markets and case-by-case adjudication enable decision makers to rely on local knowledge.
- Markets and the common law make local mistakes; regulators make mistakes on a grander scale, sometimes even national or global mistakes.
- Regulators make decisions influenced by political factors; juries and individuals in markets make decisions based on specific circumstances, general principles, and self-interest.¹⁸⁸

Each of these comes into play in the malaria debacle. Regulators in the United States are in a poor position to evaluate the conditions in malaria-ridden areas of other nations that might justify DDT's use.

188. For a more detailed discussion of the differences between central planning and markets and common law, see Andrew P. Morriss & Roger E. Meiners, *The Destructive Role of Land Use Planning*, 14 TUL. ENVTL. L.J. 95, 109 (2000); and Andrew P. Morriss, Bruce Yandle, & Terry L. Anderson, *Principles for Water*, 15 TUL. ENVTL. L.J. 335; and Roger Meiners & Bruce Yandle, *Common Law and the Conceit of Modern Environmental Policy*, 7 GEO. MASON L. REV. 923 (1999).

Yet American regulators are pressing to extend their ban on DDT to the entire world in response to political pressure from domestic environmental interest groups.

C. Protecting Public Health Under the Common Law

Some readers may be a bit nervous at this point. "We agree with the need to use every available tool to fight public health hazards like malaria," readers may think, "but wouldn't those programs be immediately tied up with lawsuits by people asserting property rights to block spraying on exactly the grounds you suggest?" And, indeed, there are lawsuits underway in attempts to block public health related spraying programs against mosquitoes potentially carrying the West Nile virus (not using DDT) in the United States today. How can the common law handle such cases without endangering the public health?

Three things make us believe that the common law could strike the proper balance in such cases, or at least get a great deal closer than the administrative-statutory central-planning methods we currently rely upon. First, courts faced with a suit by a property holder seeking to block a public health related spray campaign, whether today or on Long Island in the 1950s, have three choices: (1) enjoin the spraying program; (2) permit the spraying program, but award the plaintiff damages; and (3) permit the spray program without awarding damages. If a public health emergency exists, the second option is consistent with both the protection of the public health and private property rights.

Second, putting government spraying programs "on budget" by requiring them to pay for the property they damage will force authorities to balance the costs and benefits of their actions differently than if they are able to take property without compensation.¹⁸⁹ The problems with the pest eradication programs we described earlier was that they were only marginally beneficial even under the assumptions that the pesticides used were not environmentally harmful. (Recall that southern farmers had to be given the chemicals to use against the fire ants to induce their participation.) Such programs

189. This is essentially the argument Richard Epstein makes concerning how the takings doctrine sorts government actions generally into welfare-enhancing and rent-seeking. See RICHARD A. EPSTEIN, *TAKINGS* (1989).

would be unlikely to survive the costs of compensating property owners.

Third, many of the problems of pesticide use generally and of DDT use in particular are related to their application in relatively indiscriminate fashion. The fire ant and gypsy moth programs, for example, sprayed tens of thousands of acres. A requirement that the programs compensate wronged property owners would create an incentive to minimize compensation costs by choosing less indiscriminate application methods. Ground spraying of infested spots could be substituted for aerial spraying of entire counties, for example.

A second problem remains, however. All of the above relate to solving acute toxicity problems related to pesticide use, not chronic problems. Particularly in the case of bioaccumulation of pesticides and their derivatives, how can the common law cope? We argued earlier that there are reasons to expect that pesticides would have evolved toward less-environmentally destructive alternatives in the absence of regulation. Even without such evolution, however, it is important to remember that bioaccumulation can be addressed in multiple ways. For example, there are multiple successful instances of wildlife groups compensating farmers and ranchers to increase desirable wildlife habitat.¹⁹⁰ Farmers paid to create habitat can also be paid to use less-destructive means of pest-control. To the extent that existing common law protections are insufficient to protect some environmental values, this may be addressed by expanding property institutions.¹⁹¹ Ownership of threatened species can be instituted (e.g. title to eagles threatened by DDT bioaccumulation could have been awarded to Native American tribes that revere the eagles, thus creating a rights holder to seek a remedy if the species were threatened.)¹⁹²

190. See, e.g., Jonathan H. Adler, *Wetlands, Waterfowl, and the Menace of Mr. Wilson: Commerce Clause Jurisprudence and the Limits of Federal Wetland Regulation*, 29 ENVTL. L. 1, 54-62 (1999) (describing private efforts).

191. See, e.g., Jonathan H. Adler, *Stand or Deliver: Citizen Suits, Standing, and Environmental Protection*, 12 DUKE ENVTL. L. & POL'Y F. 39 (2001).

192. We thank Jonathan Adler for suggesting to us that a problem in using the common law to protect birds is that wild bird species are

D. *Summary*

The problems caused by DDT and other pesticides' use were, we contend, significantly related to the government's decision to engage in massive pesticide use, indirectly encouraging pesticide use through agricultural and other programs, and refusing to respect the rights of property-owners who objected. By comparison, pesticide problems between private individuals have long been successfully dealt with by the courts using common law tort and property doctrines. By relying on centralized command-and-control regulatory schemes, the demand for which grew out of government misbehavior, regulators have changed decentralized decisions on the margin into all-or-nothing political decisions. The result is the denial of effective means of combating malaria in poor nations around the world and the deaths and immiseration of millions.

IV. CONCLUSION

Why do we favor bugs over kids by preventing the use of DDT to save millions of lives each year? Is it that the lives saved would be primarily those of people of color in developing nations? That those whose lives saved would be among the world's poorest? Is the rising death toll the result of racism? Of the indifference of multinational capitalists to the plight of the poor? Of ignorance of the solution to their problems? Of capitalist greed? None of these explain the problem. The refusal to use DDT to save lives in Africa, Asia, the Pacific Islands, Latin America and everywhere malaria and other insect-borne diseases plague humanity is due to the indifference of environmental pressure groups who elsewhere loudly tout their commitment to environmental justice for the poor and their opposition on environmental grounds to economic activity and international trade. It is also unnecessary.

The saga of DDT, now a half-century long, is the result of moving decision making from the private sector to government. It was public decision makers, spending other people's money and responding to special interest pressures, that sprayed DDT and other chemicals over millions of acres, all in the name of the public good, exercising

related to the lack of property rights in the birds and could be potentially solved by creating such rights.

the “police power,” as the courts that reviewed the spray policy said. Residents of Long Island who objected to their property being sprayed with DDT saw the consequences of central decision-making. The birds killed by overspraying experienced it directly. Today it is public decision makers, spending other people’s money, deciding that DDT may not be used and that other, less effective and more costly, measures will be taken instead. Residents of many villages in many nations who might wish to use DDT in their own homes to save their children also see the consequences of central decision making.

We posit that, except for the spraying of soldiers in World War II, the government had little justification for spraying DDT (and other pesticides) here and there. It was a violation of property rights. Where a public health rationale exists, spraying programs should compensate those whose property they damage. We agree with Dr. Murphy and the original plaintiffs who sued the USDA in 1957, contending that the spray program was a trespass on their property and deprived them of the full value of their property without compensation. Those who preferred to have pesticide-free crops may have been “irrational” in their preferences, in that there was no scientific basis for their concerns about human health impacts from trace levels of DDT, but there was no reason they should not have been able to enjoy such a preference on their own property. They asked for no forced subsidy from taxpayers; they merely asked to be left alone on their property and for their preferences to be respected.

Public decision makers have little reason to respect personal preferences to use or not use DDT on an individual’s property because it weakens the latitude of the legislature and the agencies that execute its wishes. As an Assistant Secretary of Agriculture told Congress, with respect to the fire ant spray program, “all infestations must be treated without regard to location, land use, or ownership.”¹⁹³ That is, property rights cannot be considered when the wisdom of public decision makers is expressed. As one critic noted about the spray program, it is “a monument to the power which key congressmen on strategic committees can exercise over environmental policy.”¹⁹⁴ The fire ant spray program drew the same kind of reaction among some farmers in the South that the DDT spray program drew in New York. As the USDA began to back down it admitted that “areas have been

193. BOSSO, *supra* note 20, at 87.

194. BOSSO, *supra* note 20, at 86.

aerially treated contrary to the wishes of property owners.”¹⁹⁵ Not everyone agrees with “public health” measures or even programs specifically designed to help a specific interest group, such as farmers whose land contains fire ants. Those who did not like the programs, having no legal protection, had to turn to political action, and the creation of groups such as the Environmental Defense Fund, to try get their way. Suppose the courts had held, in the early challenges to the DDT spraying, that such spraying was a trespass or a taking without compensation. What would the result have been? The bald eagle may have not suffered such large population drops that the eagles needed the protection of the Endangered Species List. Millions of lives would have been saved from malaria.

Political action, not markets and the rule of law, tends to dictate one solution for all. If you are on the winning side, you get to have your preferences forced on others and make them help pay for what you want. If you are on the losing side, you may not exercise your preferences and you are forced to pay for what the winning coalition wants.

Since the early 1970s the winning coalition has been the opposite of what dominated the previous two decades. Opponents of pesticides have the upper hand politically and rather than force people to have their property sprayed with DDT or some other pesticide, they have gotten political actors and government agencies to act on behalf of their preferences by prohibiting anyone from using DDT on their own property to protect themselves from mosquitoes and the deadly diseases they carry. To prevent a largely theoretical risk¹⁹⁶ to birds, humans suffer and die; the cause is the same • public decision makers running roughshod over the rights of citizens to protect their persons and their property in the way they most see fit.

Clearly, under the common law, one would be free to spray the inside of one’s own house to reduce the risk of a deadly disease, and the evidence suggests that it would not inflict injury on a neighbor’s property. Yet that level of personal protection, one that could be life-saving, is now prohibited because of command-and-control rules that dictate minuscule details of the use of one’s own property, even if no harm is done to anyone. Such decisions are too important to be left to politicians.

195. BOSSO, *supra* note 20, at 102.

196. The risk from house spraying, for example, is minimal.

But perhaps the groups that champion the banning of DDT are chagrined to have the issue discussed. Trading a million lives every year, and immeasurable human misery, on the basis of limited evidence from the 1960s that DDT might have caused egg shell thinning for some birds subjected to massive government spraying may strike many people as harsh. But even this understates the problem caused by central planning approaches. To pose the problem as a tradeoff between millions of lives sacrificed in poor nations because wealthy residents of Western nations are worried about bird populations is to answer the question. If indeed the risk of DDT is such that it could lead to silent springs, then billions should be spent on alternative malaria eradication, prevention, and treatment techniques. But as the RBM program indicates, present technology suggests only modest improvements in fighting malaria are likely. Yet neither of these tradeoffs is necessary. Under a decentralized property rights approach to environmental problems, pesticide issues need not be a choice between babies and birds but rather allow us to have both.

