

DDT: HOW DID WE GET HERE?

If DDT is banned then what we are really doing is moving back to a form of imperialism that will significantly hobble economic development in poor nations. Banning DDT will cause the gap between rich and poor nations to continue to expand.

Harold M Koenig MD, former US Navy Surgeon General and then President of the Annapolis Center for Science Based Public Policy. 2000.

We talk of global warming and nuclear winter bringing the end of mankind. But for centuries a tiny insect has managed the job quite nicely, destroying entire civilizations, changing the course of others, and miring others in perpetual poverty and economic malaise. Mimicking the ancient Biblical story of Adam and Eve, the purveyor of such disaster is, again, a female, the Anopheles mosquito. She carries the Plasmodium parasite that causes malaria, arguably the most devastating disease in the world, one that has killed more humans than any other disease in the planet's history.

For a brief moment in the mid-part of the 20th century we finally seemed to have the means to eradicate this deadly arthropod and its fever-inducing parasite. That moment occurred with the discovery of a chemical with the tongue-twisting name of dichloro-diphenyl-trichloromethylmethane. We know it best as DDT. Its introduction into wide use around the world by the end of World War II led public health officials to believe that they had finally found the means to cleanse the entire world of the 30 or 40 types of Anopheles mosquitoes that carried the malaria parasite.

Today, far from being renowned as a miracle compound, DDT is vilified as destroyer of nature and banned in most parts of the world.

And yet... in September 2006, the World Health Organization (WHO) lifted a ban on DDT, approving its use for indoor house spraying. As the director of the WHO malaria department said at the time: "Of the dozen pesticides WHO has approved as safe for house spraying, the most effective is DDT." Its effectiveness is so great that even the director of the Sierra Club's environmental quality program reluctantly supported it, agreeing there were "no other alternatives to indoor use of DDT."

The "Ideal" Pesticide

DDT is the result of a specific hunt in the late 1930s for the "ideal" pesticide, a pesticide with "great

insect toxicity, rapid onset of toxic action, little or no mammalian or plant toxicity, no irritant effect, no or only a faint odor (at least, not an unpleasant odor)," good chemical stability to allow for a "long, persistent action," and as wide as possible range of action affecting as many arthropods as possible. It would also have to be relatively cheap to allow for wide "economic application." Swiss researcher Paul Muller set those criteria when he began, searching for the ideal insecticide to save the fabrics of JR Geigy, the dye synthesis company he worked for, from the damaging effects of insects. Of the 5 known insecticides at the time, none met all the criteria. DDT did.

Little did Muller know that he would win the Nobel Prize in Medicine in 1948 for his discovery. The fact that the Nobel Prize in medicine was awarded to the man who discovered a way to kill bugs - the flying and crawling kind, not the bacterial and viral kind - speaks volumes about the benefits of DDT.

Muller himself knew the strength of his discovery, as he recalled in his 1948 Nobel Laureate speech: "My fly cage was so toxic after a short period that even after very thorough cleaning of the cage, untreated flies, on touching the walls, fell to the floor. I could carry on my trials only after dismantling the cage, having it thoroughly cleaned and after that leaving it for about 1 month in the open air."

Insects are the vectors for many of the world's most devastating illnesses; including typhus (lice), encephalitis (fleas), yellow fever, dengue fever and malaria (mosquitoes). These and other diseases had stunted economic growth around the world, killed hundreds of millions, and made parts of the world uninhabitable. Until DDT.

After Muller patented DDT in 1940, the US military quickly latched onto it. The military sprayed it throughout Europe near the end of World War II to control malaria, typhus and other insect-borne diseases. Its use was critical in eradicating devastating bouts of typhus and malaria in parts of Italy, Sardinia and Greece, leading an historian to remark that malaria eradication "was the most important single fact in the whole of modern Italian history." It was called the "wonder insecticide of World War II," and its use was the reason this war was the first in modern history in which fewer humans died from disease than from the war itself.

By the late 1960s 10 countries had completely eradicated malaria with DDT, including the United States, where the disease had devastated the south. In 1970, the National Academy of Science estimated the poison had prevented 500 million deaths from malaria in the past 20 years, while other experts suggested DDT had averted more than 1 billion human illnesses. A 1970 article in an Indian news-

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paper attributed the lengthened life-span of humans in that country from 32 years in 1948 to 52 years in 1970 to DDT.

Unfortunately, efforts to eradicate malaria in the rest of the world, led largely through the WHO's Global Malaria Education Campaign adopted in 1955, failed for a variety of bureaucratic and economic reasons.

Silent Spring

Then came Rachel Carson's *Silent Spring*. The book, published in 1962, was an indictment of the environmental devastation wrought by DDT. It tracked the way DDT entered the food chain, showed how it accumulated in the fatty tissue of mammals and other living things, and claimed it caused cancer in humans. Carson warned that unless DDT was banned, it would silence forever the birdsong and other natural sounds of our world. The book became an influential book of the 20th century, and is still assigned to high school and junior high school students around the country.

After Dr Carson's book was published, President John Kennedy called for an investigation of its claims. In 1972, 10 years later, the fledgling Environmental Protection Agency (EPA) banned the use of DDT. The agency did this despite 7 months of hearings and the declaration of its own administration law judge that DDT did not cause cancer or birth defects in man, nor did it have any significant deleterious effect on "freshwater fish, estuarine organisms, wild birds or other wildlife."

The EPA decision marked the first time the "precautionary principle," a policy forbidding or limiting the use of chemicals based on their potential risk for harm, was used to justify a comprehensive ban. By the end of the decade, nearly every other country in the world had followed.

The effects were quickly apparent. In Sri Lanka, for instance, the country's malaria burden had shrunk from 2.8 million cases in the 1940s to just 17 in 1965, the same year it stopped using DDT. The number of cases had risen to 500,000 only 5 years later. The same year the US banned DDT, Dr Carson's book was re-released with a new cover. As her publisher wrote: "No single book did more to awaken and alarm the world than Rachel Carson's *Silent Spring*. It makes no difference that some of the fears she expressed 10 years ago have proved groundless, or that here and there she may have been wrong in detail. Her case still stands, sometimes with different facts to support it."

Even 40 years after the publication of *Silent Spring* many of Carson's claims have still failed to material-

ize. Although it was found to cause eggshell thinning in some bird species, DDT had no effects on others. While no one disputes that DDT and its metabolite, DDE (dichlorodiphenyl-dichloroethylene) persists in the environment and in the fat of mammals and fish, no evidence has been reported of significant toxicity in humans, nor strong link with cancer. Buildups in animals and humans are attributed more to its agricultural uses than to its use as a disease preventive. As Amir Attaran, a lawyer and human rights advocate, noted in an essay published in the *British Medical Journal* in 2000: "Not even 1 peer-reviewed, independently replicated study linking exposure to DDT with any adverse health outcomes" exists.

Rather than a precautionary approach, those who favor a return to DDT spraying argue, we should be focused on a risk-benefit analysis. For instance, the primary use of DDT in malarial zones is indoors, where small amounts are sprayed once or twice a year. No more is needed because the chemical has such a long staying power. Even though some mosquitoes have developed a resistance to it, they still stay away from DDT-sprayed environments.

And countries that tried to ban the pesticide often return to it. South Africa gave up on DDT in 1996 under increasing pressure from the international community and environmentalists. As malaria rates soared despite the use of more expensive pyrethroid insecticides, the country returned to DDT spraying in 2000. As Attaran asks: "If the wealthiest, most scientifically advanced, and least malarious major country of sub-Saharan Africa cannot make do without DDT, how can superendemic and impoverished countries like Tanzania, Congo, or Mozambique do so? Should they be asked to?"

They almost had to. In 2001, 91 countries signed the Stockholm Convention on Persistent Organic Pollutants, a treaty that laid out controls over the production, import, export, disposal and use of 12 persistent organic pollutants, including DDT. However, after a great outcry from an international array of public health and government officials, including a public letter signed by more than 400 physicians, the treaty granted DDT a "health-related exemption" until cost-effective, environmentally friendly alternatives can be found.

Given the WHO's recent announcement, I believe that time remains far in the future.

By D Gordon