

DDT and Malaria

A case study of Environmentalism and Development

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Introduction

There are few chemicals that are as controversial as DDT. The pesticide is the totemic bad boy of the environmentalist movement – indeed many of these groups built their reputation and entire organizations on the campaigns against it.

Mention the letters DDT to anyone and they are likely to recoil in horror. Very few people appreciate the enormous contribution that the chemical made to public health in the past and have very little clue of its current relevance to disease control right now.

Most of you will already know a bit of the history of DDT. Synthesised in 1894, it was only commercially produced shortly before the Second World War by Paul Muller, who was awarded the Nobel Prize for his efforts. Its first use in disease control was by the allied forces that used it to control typhus and doused hundreds of thousands of people in the powder to kill off parasites such as lice. It was used throughout Europe and in the Far East.

The WHO, funded largely by the US Agency for International Development (USAID) launched the Global Malaria Eradication Campaign which was basically based on vector control using DDT. There were some remarkable successes as most of you will no doubt know. I will not dwell much on the history of DDT use, as I wish to concentrate more on some of the threats to its continued use and production. Suffice it to say that DDT was used very successfully to control malaria in many parts of the world. The success however in much of the developing world was short lived – vector control is complicated requiring almost military precision (if that is not an oxymoron), good planning, parasitological and entomological studies and many developing countries simply did not have this capacity.

Anti-DDT Campaigns

During the 1960s the campaign against DDT and other synthetic chemicals began in earnest. Rachel Carson wrote her book *Silent Spring*, which to a very large extent kick started the environmentalist movement. The book is well written and paints a picture of a world devastated by the excessive use of man made chemicals. The only problem with the book is that it was wrong. The 1972 edition of the book even admits that she was wrong. The blurb at the back says:

“ 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 ten years ago have proved groundless or that there here and there she may have been wrong in detail. Her case still stands, sometimes with different facts to support it.”

Well, the different facts are ALSO wrong. There were some extraordinary claims in *Silent Spring* that simply do not tally with the facts. For instance:

- Many of the studies upon which her claims were based were unscientific and biased. For example, Carson cites Dr. DeWitt's experiments on quails and pheasants as evidence that DDT can damage reproduction. IN reality, DeWitt's study showed that those quails that were fed large doses of DDT had 80% of eggs hatching compared with a control of 83.9%. As for the pheasants, 80% of the eggs of pheasants that were fed DDT for a full year hatched, compared with 57% of the control group pheasants.
- Carson said that DDT was a liver carcinogen in Silent Spring and a breast carcinogen in Our Stolen Future. The reality is that the studies into the human carcinogenicity of DDT are inconclusive. The National Institute of Cancer rates DDT as a possible carcinogen – this is a lower rating than Coffee!
- DDT was supposed to cause egg shell thinning, however numerous scientific studies have refuted these accusations stating that DDT does not cause serious egg shell thinning. Egg shells of red-tailed hawks were reported to be 6% thicker during years of heavy DDT use as compared to before and Golden eagle eggs were 5% thicker than those produced before DDT. – The possible reasons for egg shell thinning were oil, mercury, stress of noise etc and habitat changes.
- Carson said that the American Robin population was disappearing during DDT use – in reality the population of American Robins rose during DDT use.
- DDT was blamed for the decline in bald eagles – in reality the decline in these birds took place long before DDT came into use. They were threatened with extinction in 1921, 25 years before DDT use.
- Bird populations increased in numbers during DDT use

The Environmental Defence Fund (EDF) was really born and achieved its very considerable reputation on the back of the campaign against DDT. It was this organisation that pushed the newly formed Environmental Protection Agency (EPA) to hold conduct legal proceeding to ban DDT. The EPA was newly formed in the early 1970s and under the leadership of William Ruckelshaus was keen to flex its muscles. DDT was a perfect case.

Seven months of hearing were held with evidence being given for and against a ban. The administrative judge ruled that DDT should not be banned as it was not a carcinogen and did not have a deleterious effect on freshwater fish, estuarine organisms, birds or other wildlife. William Ruckelshaus didn't attend a single hour of the hearings and yet as the head of the EPA overruled the judge and banned DDT anyway.

When Ruckelshaus was as assistant attorney general stated that DDT was had an "exemplary record of safe use" and that the claims of its carcinogenicity were "unproven speculation." A year later however when addressing the Audubon Society he said that he was deeply suspicious of DDT and that the EPA he had streamline policy and could suspend DDT at any time. He later said that as head of the EPA he was a maker of policy and not an advocate of the government as he was when attorney general.

So, politics ruled the day and sound science lost most dramatically. Ever since, there have been so many cases of where politics, hype, exaggeration and misinformation have led to the banning or restrictions of technologies without any scientific evidence.

Perhaps it is most revealing to understand the mindset of the environmentalists at the time of the banning, by looking at some of their comments made during the EPA hearings.

When it was pointed out that DDT saved lives, a USAID official stated "Rather dead than alive and riotously reproducing"

Charles Wurster stated: “So what, people are the cause of all the problems. We have too many of them. We need to get rid of some of them and this is as good a way as any.”

He went on to state: “If the environmentalists win on DDT, they will achieve a level of authority they have never had before. In a sense, much more is at stake than DDT.”

The Neo-Malthusian philosophy was and is widespread: Thinking that it would be unkind to save people from malaria just so that they could die of starvation. Some thought that malaria was a blessing in disguise “.. since a large proportion of the malaria belt is not suited to agriculture, and the disease has helped to keep man from destroying it.” Vogt, 1949:13,28

DDT was banned in most countries for agricultural use, but remained available for public health use. It continued to be used in malaria control around the world, but with increasing protests and campaigns by environmentalist groups.

The POPS convention

Perhaps the greatest threat to the continued use of DDT for disease control came in the Stockholm Convention on Persistent Organic Pollutants. The green groups campaigned very vociferously for a complete ban of DDT, but after the work done by Amir Attaran, Malaria Foundation International, AFM and the South African Government, an exemption for its use in disease control was granted.

Much of the arguments used by the green groups focussed on the supposed health risks of DDT. There are numerous studies (mostly laboratory studies) that have been conducted into the potential impacts of DDT on human health. Most of these studies are inconclusive, but there are many of them and they always get good press coverage. However, it is important to remember that in all the years that DDT has been used, in agriculture and in disease control, that not one scientifically replicated study has been able to produce a case of actual human harm from DDT. Given that it has been used for over 60 years, this is highly significant. If DDT was really so dangerous to humans, then we would have expected huge peaks in cancer rates and birth deformities after the Second World War. Remember that hundreds of thousands of people were doused in DDT all around the world. And yet there was no such increase in disease.

One always has to compare the potential risk of harm from DDT with the very real benefits that it can bring in controlling malaria – a disease that does actual harm that we are all very clear about.

Although the POPs convention grants DDT an exemption for disease control, it still places some onerous restrictions on the producers and the users of DDT. The Convention requires all signatories to develop regulatory and other mechanisms to ensure that DDT is restricted to healthcare use. It also requires that countries implement “sustainable alternatives, products, methods and strategies” and promote alternatives to DDT. In addition, countries are required to strengthen their healthcare provision – an odd requirement, as this is surely something that countries would under normal circumstances be striving to do.

The impact of all this is that it is likely to increase the transaction costs in procuring DDT. If there are more bureaucratic hoops for the producers and importers to jump through, this will most certainly add to the costs. It is also likely to increase the amount of time it takes to get hold of the insecticide, something which did actually happen in Zambia recently, when malaria control officers on the Zambian Copperbelt almost did not get the DDT that they required in time for the spray season.

All of this increases the costs and difficulties of using DDT, creates uncertainty and breaks down the free market transaction in the chemical. It also makes DDT less attractive to produce and given the small niche market that exists for the insecticide, this makes it less viable to produce.

Ongoing Anti DDT/Chemical Pressure

There are many reasons for concern about the campaign against DDT and the Stockholm Convention. First, it is important to remember that the environmentalist groups are well funded, very organized and very good at what they do. At the fifth and final negotiating committee meeting of the POPs convention, held in Sandton, South Africa, there were almost four times as many representatives from environmentalist NGOs (all opposed to DDT) as there were representatives from the whole of sub-Saharan Africa. The power that these groups had to lobby and influence the country representatives was enormous.

When one considers how well funded these groups are – Greenpeace had a campaign budget of \$100 million in 2000 – they certainly have the resources to continue to push for the elimination of DDT in the future. But clearly DDT is not the only chemical being targeted. Article 8 of the Stockholm Convention makes allowances for other chemicals to be added to both Annexure A and B. Many of the green groups have already made it clear that they are going to be campaigning against many other chemicals.

A cursory look at some of the websites of environmentalist groups highlights some of their intentions.

Greenpeace states the following:

“Given the persistent nature of POPs, there is only one way forward to safeguard future generations. This is to phase out the production and use of all POPs and other hazardous substances and implement clean production technologies.

Greenpeace Demands....

The production and use of all POPs must be phased out at national, as well as international and ultimately global level.

This must be achieved through the substitution of POPs (or the processes which generate them) with non-hazardous alternatives.

*Ultimately, measures to eliminate releases of POPs and other hazardous substances to the environment will need to be taken not just on a regional but on a **global basis**, because chemical contamination of the environment is a global problem and chemicals do not respect national boundaries.”*

<http://www.greenpeace.org/toxics~html/content/pop4.html>

International Pesticides Elimination Network declares:

*“Understanding that this initial list of twelve POPs is **only a starting point**, and that expedited expansion of the list is needed in order to incorporate into the Convention other persistent, toxic substances of global concern that harm ecosystems and human health.”*

<http://www.ipen.org/stochholmdec.html>

Finally, the Pesticide Action Network North America states that:

*“The 12 POPs chemicals initially included under the treaty are the pesticides endrin, mirex, toxaphene, chlordane, heptachlor, aldrin, dieldrin, and DDT; the industrial chemicals hexachlorbenzene (also used as a pesticide) and PCBs; and the industrial byproducts dioxins and furans. **Many other compounds are likely to be targeted for elimination as well.***

We are now focusing on building the political will and financial, technical and popular support needed to implement the treaty and move the international community toward rapid adoption of alternatives to POPs pesticides.”

<http://www.panna.org/panna/campaigns/pops.html>

Given that there are only 4 classes of insecticide – organochlorines, organophosphates, carbamates and synthetic pyrethroids – any campaigns against them dramatically reduces the number of options left open to public health officers. In Southern Africa, there is widespread resistance of anopheles mosquitoes to carbamates and also to synthetic pyrethroids. Reduction in the choice that malaria control officers have in which insecticide to use hampers their ability to effectively control the disease and at the end of the day endangers lives.

What is perhaps more worrying is that many of the environmentalist campaigners are calling for bans and restrictions on a global basis. This clearly ignores the fact that economies, environments and more particularly diseases and methods to control them differ from country to country. For sub-Saharan Africa to implement policies that are applicable to Mexico or Thailand would be completely inappropriate and again would result in an enormous number of lives being endangered.

Malaria control policies in the past that were based on global standards – such as the WHO Malaria Eradication Programme failed precisely because one size does NOT fit all. For the environmentalist groups to conduct their campaigns on the basis that what is good for one region must surely be good for another. This was not true in the past and it is difficult to see how it could be true now.

The incorporation of the precautionary principle in international agreements and as a guideline for policy makers is another change in environmental policy that can impact on public health policy. There are many definitions of the precautionary principle – perhaps the most widely used is:

“When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not established scientifically.”

Greenpeace have their own definition:

“Do not admit a substance until you have proof that it will do no harm to the environment” –
Greenpeace

On the face of it, this may seem like a sensible policy – however in reality it is something that is not scientifically based. It is impossible to prove that a substance or new technology will not have a negative impact and so what the precautionary principle does is allow for the halting or banning of technologies almost at the whim of the regulators. Given the lobbying power of the green groups, this is a very worrying factor for those of us who are interested in public health and see the need for the development of new products and technologies for disease control.

The precautionary principle ignores the fact that on balance, new technologies bring greater benefits than they do costs. It also removes the decision making from those that would be most affected by the technology. The poor and illiterate residents of sub-Saharan Africa or India are never consulted on whether they see the need for new technology or whether they consider the banning of an existing technology to be justified.

Conclusion

Rachel Carson once wrote:

"The more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction."

It is clear that she was writing for the wealthy, and healthy residents of North America and Europe. She fails to appreciate that when malaria control officers in India or Zambia go out to control the disease by using DDT or other insecticides, they do not have a taste for destroying the world – they are simply trying to save lives. They are trying to save lives so that children can grow up healthy, able to work and be productive so that one day they will be able to afford the luxury that Rachel Carson had – of enjoying the environment around them.

In conclusion, first, we believe very strongly that malaria control officers should be the ones determining malaria control policy. This policy should be free of the biased and misanthropic campaigns from environmentalist groups.

Second, the policies of the past that relied solely on vector control or solely on drug therapies have been shown not to work. Ruling out vector control with DDT or ruling it out all together would be like getting in to a ring with a prize fighter and trying to fight him with one arm tied behind your back.

Third, there is an urgent need for new technologies and governments should be trying to do everything that they can to encourage new innovation and should not be stifling it with excessive legislation and policies that adopt the precautionary principle.

Lastly, donor agencies should make a commitment to fight malaria according to sound scientific and medical evidence. This means that if the malaria control officers determine that they require extra funding to train vector control sprayers, or to purchase insecticides, then this is what should be done. The donor agencies are there to improve the lives of those in developing countries and NOT to follow policies that are determined by environmentalists within their own organisation and at home. If they are not prepared to do this and only want to fund good photo opportunities, then they should withdraw completely from public health funding.