Q & A: NACEC NARAP on DDT

Actions for Eliminating DDT in Mexico and Central America
26 April 2001

1) ***Q:*** **What is DDT?**
A: Dichlorodiphenyltrichloroethane—or DDT—is a white, crystalline, tasteless, and almost odorless synthetic pesticide belonging to the family of organic halogen compounds. It was originally produced in 1873, but it was not used until 1939 that Paul Muller of Geigy Pharmaceutical in Switzerland discovered the effectiveness of DDT as an insecticide and was awarded the Nobel Prize in medicine and physiology in 1948 for this discovery.

First used heavily in 1942 during World War II for preinvasion spraying, DDT was disseminated in great quantities thereafter throughout the world to combat yellow fever, typhus, elephantiasis, and other insect-vectored diseases. Later it was widely used to boost agricultural production by killing crop-eating insects.

DDT is insoluble in water and highly toxic toward a wide variety of insects as a contact poison that exerts its effect by disorganizing the nervous system. DDT is used to eradicate disease-carrying and crop-eating insects and is prepared by the reaction of chloral with chlorobenzene in the presence of sulfuric acid. Current production is estimated at 30,000 tonnes (Vancouver 1995) and (WWF 1998).

2) ***Q:*** **What are the hazards of DDT?**
A: DDT is a persistent insecticide, meaning that it is only very slowly degraded by natural processes and survives for a long time after its initial application. DDT can also be transported long distances through the atmosphere. Studies in the 1960s revealed that DDT bioaccumulated in the fatty tissue of fish, birds, and animals, and that the DDT levels increased in moving from species to species up the food chain. High DDT levels in birds were associated with fragile eggshells and reproductive abnormalities.

Individuals involved in the formulation of DDT have contracted rashes or irritation of the eyes, nose, and throat. Acute exposure at high doses primarily affects the nervous system. Longer-term exposure to DDT may also affect the liver. In low doses, DDT may alter the ability of the liver to metabolize other compounds, while at higher doses, it may cause unusual growths or tumors or the death of whole groups of cells (necrosis).

Children who are breast-fed are at special risk of exposure to DDT, because DDT is ubiquitous and found in human milk in higher concentrations than in cow's milk or other food. People more susceptible to the toxic effects of DDT are individuals with diseases of the nervous system, liver, or blood.

Even though DDT has not been used in the United States since 1972, under certain environmental conditions, DDT can stay in the environment for more than 30 years and small amounts remaining in soil may be transferred to crops grown there. In human fatty tissue, DDT's half-life is about seven to eight years.

Although the chemical may be a potent means of controlling vector diseases, it is persistent, toxic and transboundary in nature. International cooperation is needed to eliminate human and environmental exposure to DDT and its metabolites, while implementing alternatives to prevent outbreaks of malaria.

3) ***Q:*** **Why does the eradication of DDT require international cooperation**?
A: The North American Agreement on Environmental Cooperation (NAAEC), signed in 1993, mandated NACEC to carry out actions aimed at eliminating the use of POPs in the region. NACEC Council Resolution 95-05 addressed this issue by calling for North American Regional Action Plans (NARAP) to be developed, designed to reduce and/or phase out prioritized POP substances in the region. The choices of substances targeted by NARAPs is based mainly on the list of 12 POPs presented in the UNEP's Decision 18/32.

The NARAP on DDT (1997) is one of a number of such regional action plans undertaken by NACEC. DDT is no longer is utilized in the region, but is still widely present in the environment because of its persistence and bioaccumulative characteristics. To remove DDT in any one of the countries in North America, all three countries must work together. The NARAP on DDT provides a trinational forum to facilitate cooperation and share experiences in the elimination of the use of DDT. The NARAP is identifying chemical and non-chemical alternatives for controlling malaria and evaluating the effects of DDT on human health and ecosystems. Mexico's decision to phase-out its use rested on the success attained by the implementation of methods that included non-chemical alternatives.

4) ***Q:*** **How does the NARAP on DDT work?**
A: The NARAP on DDT committed the three North American countries to reduce and/or phase out this persistent substance. The main actions are carried out in Mexico and are focused on looking for chemical and non-chemical alternatives to control malaria through capacity building actions and research projects. Canada and United States cooperate, share information and experience with Mexico. Mexico has been trying some non-persistent pesticides to control malaria and has improved its surveillance system. As a result, Mexico stopped using DDT to control malaria in 2000. The expertise Mexico has gained is being shared with Central American countries.

5) ***Q:*** **Wouldn't this have happened in Mexico eventually anyway?**
A: NACEC's NARAP spurred early action in Mexico and played an important role in accelerating the process as outlined in the POPs treaty. Since the middle 90s, Mexico has reduced the use of DDT in controlling malaria and tested new chemicals and non-chemical alternatives. Mexico is improving the surveillance, diagnosis and treatment of malaria cases and has implemented integrated management of vector control methods.

6) ***Q:*** **What have been the successes of NACEC's NARAP on DDT?**
A: Mexico stopped using DDT completely by the year 2000 (two years ahead of the scheduled 80 percent reduction in use) and keeps only a small amount on hand for emergency malaria outbreaks. The sale and manufacture of DDT has also been completely eliminated in North America. This development in Mexico, plus the earlier ban in the US and Canada, make North America virtually a DDT-free zone.

7) ***Q:*** **If DDT is no longer used, what is replacing it to fight malaria?**
A: Mexico has succesfully used non-chemical alternatives such as environmental management of mosquitoes with community participation, use of bacilli and nematodes to control them, and the improvement of the surveillance, diagnosis and treatment system of Mexico's Health Secretariat. Chemical alternatives such as piretroids (mainly deltametrin and lamda cyalotrin) are being tested and, under the provisions of the NARAP, findings on the use of the alternatives will be presented in the summer of 2001.

8) ***Q:*** **If research to find alternatives is still ongoing, are you saying that DDT has already been eliminated without certainty about alternatives?**
A: It is important not to rely solely on synthetic chemicals as means of control. Toward this end, Mexico is using other control techniques, including community education and training, to clean up areas that are prone to infestation.

After a process of shifting from DDT to integrated control techniques for malaria, and following nearly two years of testing and using new chemicals and non-chemical alternatives, malaria cases declined. As well, Mexico's Center on Paludism Research (located in Chiapas) continues work on a sustainable strategy for integrated control of malaria without use of chemicals.

9) ***Q:*** **Are the alternative chemicals thought to be less harmful and why?**
A: Yes, any new chemicals coming on the market are much more rigorously tested and assessed prior to their introduction into the marketplace than previously. Piretoids, for instance, are less persistent and have no effects on human health and the environment in the long term. Particular focus is put on persistence and potential to bioaccumulate as key test criteria.

10) ***Q:*** **How does NACEC's NARAP relate to the POPs treaty?**
A: NACEC's NARAP has put North America ahead of the game in phasing-out DDT. It is also an example of how a cooperative mechanism created alongside a trade agreement can have positive results. NACEC's NARAP model may have applications to the elimination of POPs in other jurisdictions.