



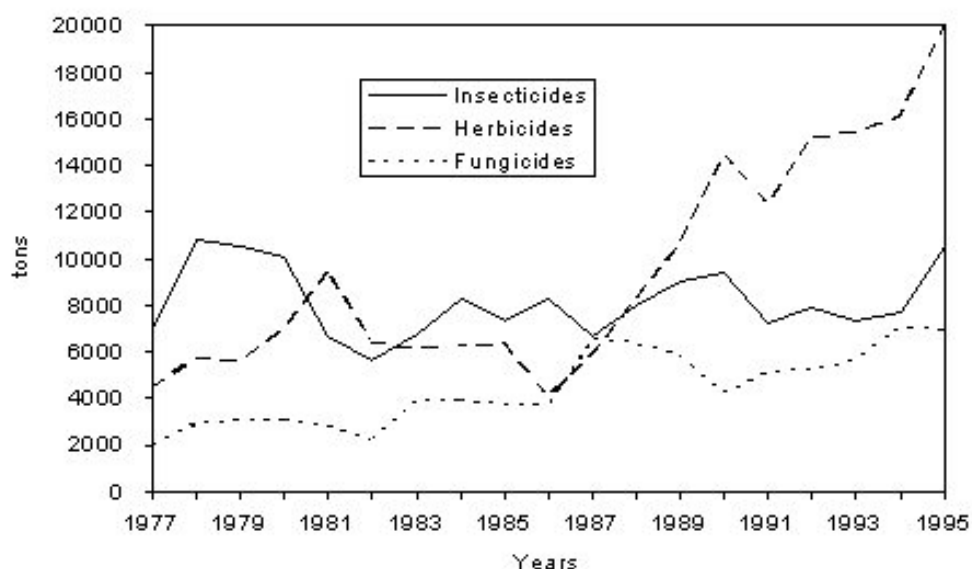
Pesticide Use in Thailand: Ecological and Human Health Effects

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Industrial agriculture – the predominant form of agriculture now being practiced worldwide – relies heavily on the use of chemical pesticides to control crop loss from insects, animals and microorganisms. Over the past several decades, pesticides have revolutionized farming techniques and have facilitated the shift from small-scale, self-sufficient and diversified agriculture towards industrial mono-cropping. Only when viewed from a narrow and distorted economic perspective does the application of chemical pesticides seem beneficial. It is now widely known that the agrochemicals being applied in staggering quantities worldwide pose serious hazards to both the environment and human health. Furthermore, as target pests mutate and evolve in response to pesticide application the chemicals decrease in effectiveness and thus must be applied in increasing quantity or replaced with new and stronger chemical varieties.

In developed nations such as the United States, concern over the impacts on human health and the environment has led to the banning of many pesticides and the strict regulation of others. However, agrochemicals represent a multi-billion dollar industry and the multinational corporations that manufacture large quantities of pesticides find markets for their products in the developing world. For example, seventy percent of the pesticides used in Thailand and India are banned or severely restricted in the West. A survey in the Indian state of Punjab detected DDT and BHC – agrochemicals banned in the west – in all of seventy-five samples of human breast milk.ⁱ During the 1980s, the US was producing 100 – 150 million pounds per year of pesticides considered too dangerous for domestic use. These chemicals were produced for export to nations with less stringent environmental standards. Ironically, such nations often use these chemicals on crops that they grow for export back to the US and Western Europe – in this way, citizens of developed countries may be exposed to chemicals banned by their own governments.ⁱⁱ

Pesticide and fertilizer contamination of drinking water from agricultural runoff is now a worldwide concern. This is especially true in Southeast Asian countries. Thailand imports the most pesticides in the region and over the past three decades has exhibited an annual growth rate in the agrochemical market reaching as high as 8.8 percent.ⁱⁱⁱ The liberal pesticide market in Thailand has resulted in the widespread availability and use of imported chemicals. Seventy-three percent of the agrochemical imports into Thailand are classified by the World Health Organization (WHO) as category Ia (extremely hazardous), or Ib (highly hazardous).^{iv} These substances proliferate under a wide variety of trade names and thus are difficult to track or regulate. For example, a 1990 study reported that monocrotophos was being sold under 274 different trade names, methyl parathion under 296 names, and paraquat under 55 names.^v

Quantity of Pesticide Imports to Thailand 1976-1995^{xi}

The tax policies of the Thai government have generally been favorable to the growing market of agrochemical imports. A 1997 report indicated that since 1991, pesticides have been exempted totally from import duty and business and municipal taxes. This tax exemption can be interpreted as an indirect subsidy for pesticide imports and contributes to low pesticide prices.ⁱⁱⁱ Additionally, the Thai government maintains a fund for pest outbreaks wherein pesticides are given to farmers for free. Researchers identified this fund as a major pesticide subsidy and indicative of the Thai government and agricultural extension service's support for agrochemical use.ⁱⁱⁱ Furthermore, the Bank of Agriculture and Agricultural Cooperatives (BAAC) – the major Thai institute for the implementation of agricultural credit policy – has issued short-term credits for agricultural inputs including pesticides.^{vi}

A major factor in the increased use of pesticides over the past few decades in Thailand and elsewhere is pest resistance and resurgence. Many pests quickly develop resistance to specific chemicals and maintain that resistance even when dosages are increased. Worldwide, the United Nations Food and Agriculture estimates that between 1957 and 1980 the number of insect arthropods resistant to at least one form of insecticide rose from twenty-five to over 430.^{vii} And while pesticide usage dramatically increased in the US in the thirty years prior to 1974, pre-harvest insect losses rose from seven to about thirteen percent over the same time period.^{viii}

In Thailand, a 1993 study revealed that the intensification of pesticide application by farmers led to the most severe outbreak of brown plant hopper on record. This organism did not constitute a threat to crops until pesticide application killed off the insects that naturally control its population; increased pesticide application thus served only to increase the severity of the outbreak.^{ix} Similarly, a 1988 report indicated that pyrethroid application to cotton crops in Thailand decreased in efficacy from around eighty to nearly zero percent within one decade. Other studies

have shown that resistance among vegetable crop pest has led to overdosing of pesticides by as much as a factor of eight times the recommended rate.^x

Many farmers and farm workers are poisoned each year by pesticide exposure. A 1983 United Nations study estimated that between four hundred thousand and two million farmers worldwide were poisoned by pesticides each year, resulting in between twenty thousand and forty thousand deaths. A 1988 report estimated that three hundred thousand farm workers in the US alone suffered from pesticide-related illnesses.^{vii}

Anecdotal evidence from speaking with farmers in and around our community at Pun Pun suggests that sufficient precautions are not taken by farm workers in the region when handling and applying pesticides. Our research so far corroborates these assertions. For example, a 1992 study concluded that farmers generally do not care about or are not aware of potential hazards pesticides may cause for themselves or the consumer. About one-half of Thai farmers apply higher than recommended concentrations and do not pay any or very little attention to labels and protective clothing.^{xi}

A backpack sprayer used for pesticide application. The bottle contains 2,4 D, a potential groundwater contaminant and possible human carcinogen.



The majority of farmers interviewed in these studies sprayed pesticides frequently, especially in the vegetable and fruit sector, and harvested their crops for marketing before the end of the products' recommended waiting period.^{vi} Economic factors tend to drive farmers to market rather than accept the losses associated with this waiting period. This has resulted in pesticide exposure to consumers: a 1995 study by the Thai Division of Toxic Substances found

that around 37 percent of vegetables, 20 percent of kale, 10 percent of cowpea and 73 percent of tangerines were contaminated with pesticide residues, consisting mainly of malathion, monocrotophos and methyl parathion.^{xii}

Several studies have identified a lack of information among farmers regarding the danger of application and handling of pesticides as well as regarding the quality and formulation of pesticides, their production date and contents. One study reports that farmers' perceptions of crop loss are usually higher than their actual crop losses, prompting pesticide overdosing. Furthermore, farmer's decisions regarding pesticide usage are often based on information given by retailers, other farmers, agricultural extension service agents and even the pesticide companies themselves.^{xiii}

The consequences of pesticide misinformation are far reaching. One study of Hmong agricultural workers in highland communities and in urban Chaing Mai indicated that 20-69% of the adults surveyed exhibited risky or unsafe levels of cholinesterase inhibition (an indicator of neurotoxicity) as evidence of exposure to organophosphate and carbamate pesticides. The study also indicated the potential of increased risk among Hmong women who possess less Thai language skill than men and therefore have reduced access to information concerning the hazards of pesticide exposure or the use of protective clothing.^{xiii} For the years 1980 – 1994, an average of around 3,350 occupational pesticide poisoning cases were reported in Thailandⁱⁱⁱ; however, many cases of pesticide poisoning are never reported. For example, a 1985 study concluded that only 2.4% of Thai workers who have been poisoned by pesticides go to the hospital.^{iv}

Furthermore, the World Health Organization identifies pesticide ingestion as one of the leading suicide methods worldwide.^{xiv} An estimated three million cases of pesticide poisoning occur every year, resulting in an excess of 250,000 deaths, representing a substantial fraction of the 900,000 people who die by suicide every year. This phenomenon is particularly significant in rural areas, especially in Asian countries. The WHO estimates that in the last decade between 60% and 90% of suicides in China, Malaysia, Sri Lanka were due to pesticide ingestion. A 2005 study found that pesticide ingestion is the second leading method of suicide in northern Thailand, accounting for about one-quarter of suicide cases in the most recent years.^{xv}

Numerous studies have reported the detection of pesticide residues in soils and groundwater in Thailand.^{xvi} One such survey by the National Environment Board found residues in one hundred percent of soil samples and 86 percent of water samples.^{iv} This discouraging reality motivates our present efforts to design an effective drinking water treatment system that is simple and elegant in design, inexpensive to build, operate, and maintain, and will enhance the potential for community self-reliance in the vital sector of drinking water.

For more information on pesticides and drinking water filtration using charcoal, see our website: aqssolutions.org

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