



Agrichemicals of Concern in Northern Thailand

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Agrichemical reconnaissance

Although pesticide contamination of drinking water supplies is a worldwide concern, the situation in developing countries such as Thailand is the most extreme, where regulations are lax or non-existent regulations permit the heavy use of many agrichemicals deemed too hazardous to ecosystems and human health for use in developed countries like the United States. Over seventy percent of the pesticides used in Thailand and India are banned or severely restricted in the West due to their toxic effects on ecosystems and human health.ⁱ Moreover, in the Indian state of Punjab DDT and BHC – agrichemicals banned in the west – have been widely detected in human breast milk.ⁱⁱ A recent survey by the Thai National Environment Board found residues in eighty-six percent of environmental water samples.ⁱⁱⁱ

A pesticide research and reconnaissance program was conducted over winter 2006 – 2007 in order to identify particular agrichemicals that pose a threat to drinking water contamination in the local region around the Pun Pun organic farming community in Chiang Mai province, northern Thailand. Three strategies were used to identify these suspect substances: (1) interviewing local farmers and the proprietors of local feed shops where the chemicals are purchased; (2) literature research via the web on the most prevalent imported agrichemicals in Thailand; and (3) investigating refuse (trash piles, garbage bins, etc.) in and around nearby fields and orchards.

Our pesticide detective work revealed the following:

Out of the **thirty-four** agrichemical products identified...

- ... **nineteen** are moderately to highly acutely toxic to humans
- ... **eight** are possible human carcinogens and **five** are known human carcinogens
- ... **nine** are cholinesterase inhibitors (indicating neurotoxicity)
- ... **ten** are suspected endocrine disruptors
- ... **six** are reproductive or developmental toxins
- ... **twenty-one** are classified as “Bad Actors” by the Pesticide Action Network
- ... and **thirteen** represent significant threats to groundwater contamination.

Chemical warfare, over-the-counter

An informal survey of local farmers and the staff of local feed shops (where agrichemicals are purchased by local farmers) identified several chemicals applied widely and liberally throughout the region that constitute a threat to drinking water supplies. Of this list of seventeen pesticide products, eight are classified by the Pesticide Action Network (PAN) as “Bad Actors.” Bad Actors are chemicals that exhibit one or more of the following properties: high acute toxicity, cholinesterase inhibition (neurotoxicity), known or probable carcinogenicity, known reproductive or developmental toxicity, or are known to constitute a groundwater pollution threat.^{iv} Furthermore, PAN identifies propiconazole, tebuconazole, metalaxyl, mefenoxam and fluazifop as potential groundwater contaminants.

A wide variety of agrichemical products are available at a shop in a nearby village.



In addition to surveying the products at the local feed stores, our research of the literature on pesticides in Thailand revealed that out of the fifteen most prevalent agrichemicals imported to Thailand, ten are classified as PAN Bad Actors and seven constitute threats to groundwater contamination. The groundwater contaminants are: methyl parathion, methamidophos, methomyl, 2,4 D, atrazine, ametryn, and paraquat.

Biocides in our backyard

Farms adjacent to our community practice pesticide-intensive conventional agriculture methods; for example, the neighboring citrus orchard, unfortunately located uphill from Pun Pun’s fishponds and irrigation reservoir.

The orange grove viewed from Pun Pun. The road leads up the hill to the cooking school at You Sabai. Note the fishpond just below.



Looking back at Pun Pun from above the orange grove. Pun Pun has several ponds in the low-lying area below the grove. The farm's water is pumped from the lowest pond – visible at the right edge of the photograph.



It is often easy to determine which chemicals are applied in Thai farm fields because, sadly, it is fairly common practice to toss empty containers in the weeds and leave half-empty bottles of chemicals lying about. The orange grove proved to be no exception in this aspect of environmental intransigence. Our investigation of discarded agrichemical packaging and empty containers we found lying around the perimeter of the orange grove revealed that ethyl hydrogen phosphonate, chlorpyrifos, propiconazole, and dimethoate are among the pesticide chemicals being

used. Thus far we have not found significant toxicological data for ethyl hydrogen phosphonate; however, chlorpyrifos, propiconazole, and dimethoate are all classified by PAN as Bad Actors, exhibit moderate to high acute toxicity to humans upon exposure, and are moderately toxic to very highly toxic to aquatic species.

Some discarded agrichemical product containers found in the weeds around the perimeter of the citrus grove and adjacent to the Pun Pun community.



Chlorpyrifos is a suspected endocrine disruptor. Both chlorpyrifos and dimethoate are associated with cholinesterase inhibition, an indicator of neurotoxicity, and can be absorbed through the skin. Propiconazole and dimethoate are possible human carcinogens as well as developmental or reproductive toxins, and are identified by PAN as potential groundwater contaminants.

Other discarded pesticide contains in the vicinity of Pun Pun contained the widely used herbicide acetochlor, a known human carcinogen and suspected endocrine disruptor.

A photo indicating the proximity of the discarded pesticide containers to one of Pun Pun's fishponds.



The proliferation of such a variety of toxic and ecologically destructive chemicals in the vicinity of our organic farming community underscores the importance of widespread efforts to eliminate the application of agrichemical pesticides and motivates our efforts to implement a drinking water purification system to mitigate the threat posed by pesticides to human health.

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

References

- ⁱ Pesticide Use in Thailand. Pesticide Action Network North America Updates Service (PANUPS). Pesticides News, March 1997. Accessed on line 03/21/07. (<http://www.panna.org/panna/>)
- ⁱⁱ The state of India's environment 1984 - 1985. Argawal A et al. Centre for Science and Environment, New Delhi, 1985.
- ⁱⁱⁱ Pesticide Use in Thailand. Pesticide Action Network North America Updates Service (PANUPS). Pesticides News, March 1997. Accessed on line 03/21/07. (<http://www.panna.org/panna/>)
- ^{iv} Pesticide Action Network online pesticide database: <http://pesticideinfo.org>, accessed 03/21/07