



From the Toxipedia website in original form. Last updated by Toxipedia in 2010. Hyperlinks to web pages that are unavailable as of August 2017 have been removed or updated.

Developed by Maria M. Williams.

## Pesticide Use in Developing Nations: Quick Facts and Resources

### Overview

---

While pesticides pose possible health and environmental hazards wherever they are used, communities in developing nations often face additional hazards uncommon in industrialized nations. The goals of this Toxipedia section are a) to raise public awareness about the impacts of pesticide use in developing nations, and b) to help link environmental health professionals in developing nations with each other and with information resources addressing these complex and critical issues.

### Topic Pages

---

- [Suicides from Pesticide Ingestion](#)
- [Increasing Stocks of Obsolete Pesticides](#)
- [Export of Toxic Pesticides from Industrialized to Developing Nations](#)

### General Resources

---

#### Nonprofit Organizations (NGOs)

- [Asian NGO Coalition for Agrarian Reform and Rural Development](#): "A regional NGO association of 20 national and regional NGO networks from 9 Asian countries actively engaged in food security, agrarian reform, sustainable agriculture, and rural development activities."
- [Environment and Human Rights Advisory](#)

- [Pesticide Action Network International](#): links to international conventions on pesticide use, and sustainable alternatives to chemical pesticides (including crop-specific information)
- [Pesticide Action Network Africa](#)
- [Pesticide Action Network Asia Pacific](#): includes Feb 2010 report *Communities in Peril: Asian Regional Report on Community Monitoring of Highly Hazardous Pesticide Use*.
- [Pesticide Action Network Latin America](#) (en Español)
- [Pesticide Action Network North America](#): excellent compilation of resources pertaining to international pesticide use (international treaties, manufacturer and industry sites, pesticide use statistics, crop loss estimates, international and activist organizations, etc.). Also offers website section Just Transitions to Sustainable Alternatives, which includes the page UN assessment of agriculture, poverty, hunger and the environment.
- Pesticide Action Network UK: Integrated Pest Management in Developing Countries; Pesticides and Poverty in Context
- Centre for Science and Environment (India): [Food Safety and Toxins Campaign](#)
- Greenpeace China: Pesticides and Health
- Institute of Science in Society: [Picking Cotton Carefully](#)

#### International Agencies

- International Labour Organization (ILO): Program on Safety and Health at Work and the Environment (SAFEWORK), [Chemical Safety and the Environment](#)
- Food and Agriculture Organization (FAO): [Plant Production and Protection Division](#) (includes section on pests and pest management)
- [Interstates Pesticide Committee for Central Africa](#): "The major objective of CPAC is the sanitation of agricultural production for the preservation of the environment and the health of local consumers, as well as to enhance the competitiveness of local agricultural produce on the international market."
- [Pan-American Health Organization \(PAHO\)](#)
- The World Health Organization (WHO): [Pesticide Evaluation Scheme \(WHOPES\)](#)
- The World Health Organization (WHO) [Environmental Burden of Disease Country Profiles](#): "WHO presents updated country data on the burden of disease that is preventable through healthier environments. These estimates provide the stepping stone for informed policy making in disease prevention."
- OECD Environmental Directorate Pesticides Programme: "The Pesticide Programme helps OECD governments to co-operate in assessing and reducing the risks of agricultural pesticides." (No longer available. Alternate resource: [OECD Environment Directorate Agricultural Pesticides Programme](#))

- UN Environment Program (UNEP), Pesticide-related Activities at UNEP Chemicals: "The UNEP/DTIE Chemicals Branch actively promotes sound management of chemicals within the framework of Strategic Approach to International Chemicals Management (SAICM)." (No longer available.)
- UN Environment Program (UNEP), Caribbean Environment Programme: [Persistent Organic Pollutants \(POPs\) and Pesticides](#)
- The World Bank: [Research in Vietnam and Bangladesh sheds new light on health impacts of pesticides; Pesticide Use in Developing Countries: Vietnam Case Study](#)

## Books

Pimentel, David, ed. *Encyclopedia of Pest Management*. Taylor & Francis, 2006. (Includes the article "Pesticide Health Impacts in Developing Countries" by Aiwerasia V. F. Ngowi, Catharina Wesseling, and Leslie London. Abstract available [here](#).)

Farah, Jumanah. *Pesticide Policies in Developing Countries: Do They Encourage Excessive Use?* Washington, D.C.: World Bank, 1994.

## Peer-Reviewed Articles

---

*Unless otherwise noted, the links below are for article abstracts.*

- Ecobichon, DJ. ["Pesticide use in developing countries."](#) *Toxicology*. 2001, Mar 7; 160(1-3):27-33.
- Wesseling, C., McConnell, R., Partanen, T., and Hogstedt, C. ["Agricultural pesticide use in developing countries: health effects and research needs."](#) *International Journal of Health Services*. 1997; 27, 2: 273-308.
- Kesavachandran, CN; Fareed, M; Pathak, MK; Bihari, V; Mathur, N; Srivastava, AK. ["Adverse health effects of pesticides in agrarian populations of developing countries."](#) *Reviews of Environmental Contamination and Toxicology*. 2009; 200:33-52.
- Forget, G. ["Pesticides and the Third World."](#) *Journal of Toxicology and Environmental Health*. 1991, Jan; 32(1):11-31.
- Mansour, SA. ["Pesticide exposure--Egyptian scene."](#) *Toxicology*. 2004, May 20; 198(1-3):91-115.
- Igbedioh, SO. ["Minimizing environmental and health effects of agricultural pesticides in developing countries."](#) *Ambio*; 20 (6). 1991. 219-221.
- Graber DR; Jones WJ; Johnson JA. ["Human and ecosystem health: the environment-agriculture connection in developing countries."](#) *Journal of Agromedicine*. 1995; 2(3):47-64.
- Igbedioh SO. ["Effects of agricultural pesticides on humans, animals and higher plants in developing countries."](#) *Archives of Environmental Health*. July/Aug. 1991, Vol.46, No.4, p.218-224. 52 ref.

- Koh D; Jeyaratnam J. "[Pesticides hazards in developing countries.](#)" *The Science of the Total Environment*. Sep. 1996, Vol.188, Suppl.1, p.S78-S85. 21 ref.
- London L; de GS; Wesseling C; Kisting S; Rother HA; Mergler D. "[Pesticide usage and health consequences for women in developing countries: out of sight, out of mind?](#)" *International Journal of Occupational and Environmental Health*. 2002 Jan-Mar; 8(1):46-59.
- el Sebae AH. "[Special problems experienced with pesticide use in developing countries.](#)" *Regulatory Toxicology and Pharmacology*. 1993, Jun; 17(3):287-91.

## a) Suicides from Pesticide Ingestion

### Quick Facts

---

"Facts:

- Worldwide, an estimated three million cases of pesticide poisoning occur every year, resulting in an excess of 250,000 deaths.
- This mortality accounts for a substantial fraction of the almost 900,000 people worldwide who die by suicide every year.
- In attempted suicide, which is considerably more frequent than completed suicide, pesticide poisoning results in temporary or permanent disability.
- Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many agricultural communities of low- and middle-income countries, including China, India, Sri Lanka, and Viet Nam.
- Efforts to develop a systematic and sustainable approach to the prevention and management of pesticide poisoning remain inadequate."

(source: [World Health Organization, 2004](#))

### Website Resources

---

World Health Organization: [The Impacts of Pesticides on Health: Preventing Intentional and Unintentional Deaths from Pesticide Poisoning](#) (fact sheet)

World Health Organization Bulletins:

[Women and suicide in rural China](#) (December 2009)

[Pesticide exposure and suicidal ideation in rural communities in Zhejiang province, China](#) (October 2009)

### Peer-Reviewed Articles

---

*Unless otherwise noted, the links below are to article abstracts.*

Gunnell, David and Eddleston, Michael. "[Suicide by intentional ingestion of pesticides: a continuing tragedy in developing countries.](#)" *International Journal of Epidemiology* 32 (2003): 902-909. *Full text.*

Konradsen, F. "[Acute pesticide poisoning--a global public health problem.](#)" *Danish Medical Bulletin* 54, 1 (2007): 58-59.

Gunnell D., Eddleston M., Phillips M.R., and Konradsen F. "[The global distribution of fatal pesticide self-poisoning: systematic review.](#)" *BMC Public Health*. 7, 357 (2007).

van der Hoek, W. and Konradsen, F. "[Risk factors for acute pesticide poisoning in Sri Lanka.](#)" *Tropical Medicine and International Health*. 10, 6 (2005): 589-96.

Konradsen F; van der Hoek W; Cole DC; Hutchinson G; Daisley H; Singh S; Eddleston M. "[Reducing acute poisoning in developing countries--options for restricting the availability of pesticides.](#)" *Toxicology*. 2003, Nov 5; 192(2-3):249-61. *Full text.*

Gunnell, D.; Fernando, R.; Hewagama, M; Priyangika, W. D. D.; Konradsen, F; and Eddleston, M. "[The impact of pesticide regulations on suicide in Sri Lanka.](#)" *International Journal of Epidemiology* 2007 36(6):1235-1242. *Full text.*

JM Bertolote, A Fleischmann, M Eddleston, and D Gunnell. "[Deaths from Pesticide Poisoning: Are we lacking a global response?](#)" *British Journal of Psychiatry*. 2006 September; 189: 201-203. *Full text.*

Wesseling C; Corriols M; Bravo V. "[Acute pesticide poisoning and pesticide registration in Central America.](#)" *Toxicology and Applied Pharmacology*. 2005, Sep 1; 207(2 Suppl):697-705.

London, L. and Bailie, R. "[Challenges for improving surveillance for pesticide poisoning: policy implications for developing countries.](#)" *International Journal of Epidemiology*. 2001, Jun; 30(3):564-70. *Full text.*

## b) Increasing Stocks of Obsolete Pesticides

### Overview

---

Dangerous and outdated pesticides, most of which have been banned in the US and EU, still pose an immense threat to the health and environment of many developing nations. Many of these pesticides are highly toxic, environmentally persistent chemicals. Developing nations purchase outdated pesticides because they are cheaper. Aid organizations or industrialized nations may offer excess pesticides as donations to developing nations, which lack the means and the funds to dispose of old pesticides. Poor legislative abilities and lack of research also contribute to the problem. Illiteracy and lack of information puts workers at risk, who often fail to protect themselves. These pesticides are also stored in substandard conditions, where they leak, contaminating soil and water. (sources: FAO, PAN-UK, Regulatory Toxicology and Pharmacology, Africa Recovery)

*"Most developing countries are left with large stocks of obsolete pesticides. Generally, these are excess pesticides that can no longer be used because they have deteriorated as a result of prolonged storage, or because their use has been banned while they were still kept in store. They are now regarded as hazardous waste. Due to lack of environmentally sound disposal facilities in developing countries, the total volume of such stocks is gradually increasing. Most of the stocks are kept in sub-standard stores and are in a deplorable state. Drums are stored in the open, exposed to direct sunlight and rain. As time goes by, containers deteriorate and start leaking. This process is*

often accelerated by unfavourable climatic conditions. These obsolete stocks invariably pose a severe threat to human health and the environment, particularly if they are located in urban areas or near water bodies, which unfortunately is often the case. Ground water, irrigation water and drinking water are at risk. Direct exposure of human beings, livestock or food is another danger. Disasters caused by obsolete pesticides can be expected if adequate action is not taken to address the present situation."

(source: [Pesticide Action Network UK](#))

## Resources

---

- Africa Recovery, United Nations. "[Pesticide 'time bomb' ticking in Africa: Toxic dumps threaten people, livestock and land.](#)" *Africa Recovery*, 15, 1-2 (2001): page 42.
- Brown, VJ. "Old Pesticides Pose New Problems for Developing World." *Environ Health Perspectives*. 2001 December; 109(12): A578-A579. ([Full text PDF, see page 3.](#))
- el Sebae AH. "[Special problems experienced with pesticide use in developing countries.](#)" *Regul Toxicol Pharmacol*. 1993 Jun;17(3):287-91. (Abstract only.)
- Food and Agriculture Organization (FAO): [Prevention and Disposal of Obsolete Pesticides](#)
- Pesticide Action Network UK: [Obsolete Pesticides in Context](#); [Obsolete Pesticides in Developing Countries](#)
- Pesticide Action Network Africa (PAN-Africa): Africa Stockpiles Program (Alternate resource: FAO: [Africa Stockpiles Program](#))
- World Bank Energy and Environment Research. 2009. [Toxic Waste from Obsolete Pesticides: A Growing Threat in Developing Countries.](#)

## c) Export of Toxic Pesticides from Industrialized to Developing Nations

### Quick Facts

#### Banned Pesticides Being Sold in Developing Countries

---

"There are many cases where highly hazardous pesticides, which are not permitted for use in industrialized countries, are exported to developing countries.

For a pesticide to be banned, it has to be registered first. Some pesticide companies have not registered or re-registered products which they knew would have not have been authorized in their own country but continue to produce and export the same products to developing countries. There are also cases of pesticide manufacturers

increasing exports of products that have been banned or restricted in their own countries, possibly in order to use up existing stocks or to compensate for depleted local markets.

Pesticide companies have also been able to circumvent bans on specific products by building formulation plants for the product in developing countries. They then supply the technical grade active ingredients needed to make the pesticide and claim that the product itself is locally manufactured.

The argument is put forward that developing countries are demanding these hazardous pesticides because less toxic products are often too expensive."

[\(Source: Food and Agriculture Organization\)](#)

### **U.S. Exported 27 Million Pounds (12.3 Million Kilograms) of Pesticides Banned in U.S. between 2001 and 2003**

---

"According to U.S. Customs records, between 2001-2003, the U.S. exported nearly 1.7 billion pounds of pesticide products - 32 tons per hour. A study by Carl Smith of the Foundation for Advancement in Science and Education, published in the International Journal of Occupational and Environmental Health, notes that these exports included "27 million pounds of pesticides whose use is forbidden in the U.S.," including "500,000 pounds of known or suspected carcinogens." Endocrine disrupting pesticides were sent overseas at the rate of 100 tons a day. Most of the exports - including shipments of deadly persistent organic pollutants (POPs) - were destined for developing countries."

(Source: Pesticide Action Network)

### **U.S. Environmental Protection Agency Policy on Export of Unregistered Pesticides**

---

"Pesticides that are not approved - or registered - for use in the U.S. may be manufactured in the U.S. and exported. FIFRA Section 17(a) requires that exporters of unregistered pesticides first obtain a statement signed by the foreign purchaser indicating the purchaser's awareness of that product in the U.S. The requirement is shipment-specific for a particular exporter, product and purchaser.

To ensure that national officials responsible for the protection of health and the environment are informed of this shipment, EPA transmits a copy of the statement to the Designated National Authority (DNA) (so designated as part of the United Nations program on Prior Informed Consent) in the receiving country. EPA is placing the highest priority on timely notification for two categories of exported pesticides which EPA believes may be of greatest concern to countries:

1. pesticides on the international list of Prior Informed Consent (PIC), most of which have also been banned or severely restricted in the U.S., and
2. other pesticides banned and severely restricted in the U.S. for health or environmental reasons, which are not on the PIC list.

It is EPA's intention to make the U.S. export notification program compatible with the international one, while meeting domestic legislative requirements. Revisions to the U.S. export notification program will be considered in the context of implementation of the PIC Agreement."

(source: U.S. Environmental Protection Agency: Import and Export Trade Requirements; alternate resource: U.S. EPA: [Importing and Exporting Pesticides and Devices](#))

## Resources

### NGOs and International Agencies

---

- Food and Agriculture Organization (FAO): [Prevention and Disposal of Obsolete Pesticides](#) *Comprehensive and excellent resource.*
- Foundation for Advancements in Science in Education: Exporting Risk - Documenting Hazardous Trade (reports and maps of pesticide exports from U.S. ports between 1992 and 2000)
- Pesticide Action Network: Pesticide Exports from U.S. Ports, 1997-2000

### News Articles

---

- Albion Monitor. December 21, 1995. [U.S. Companies Still Export Banned Pesticides](#). [accessed March 18, 2010]
- Counterpunch. September 7, 2006. [The Global Trade in Deadly Pesticides](#). [accessed March 18, 2010]
- Earthjustice. December 17, 2001. Press Release: "[UN Human Rights Investigator Deems U.S. Export of Banned Pesticides 'Immoral'](#)." [accessed March 18, 2010]

### Peer-Reviewed Articles

---

- Lowry, L.K. and Frank, A.L. "[Exporting DBCP and other banned pesticides: consideration of ethical issues.](#)" *International Journal of Occupational and Environmental Health*. 1999 Apr-Jun;5(2):135-41.
- Holley, Michael. [The EPA's Pesticide Export Policy: Why the United States Should Restrict the Export of Unregistered Pesticides to Developing Countries](#). *New York University Environmental Law Journal*, 9, 2; 2001.