Herbicides and the Environment

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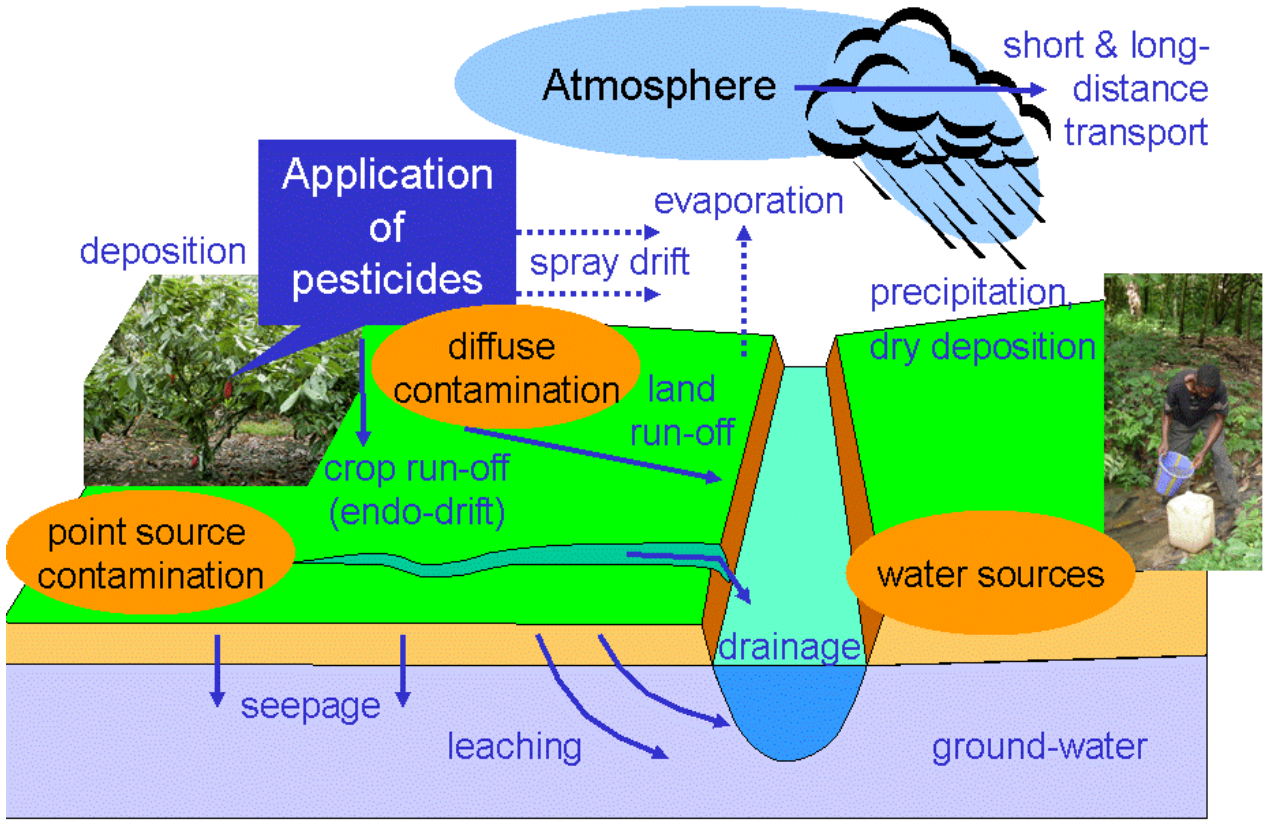
Fundamental concepts

- Herbicides are synthetic chemical molecules that do not occur naturally in the environment.
- All herbicides can be dangerous. Few are inherently dangerous when used properly.
- Herbicides control weeds and manage vegetation in situations where no other method is as efficient.
- Herbicide performance is measured by activity, selectivity, and soil residual behavior.
- Herbicide resistance is an important, increasingly difficult aspect of herbicide use.
- There are positive and negative interactions that occur whenever weeds are controlled.
- Science can measure risk; safety is a normative political judgement.

Water pollution

- Possible pesticide contamination of ground and surface water is a matter of national importance.
- It is especially important for people in agricultural areas where about 95% rely on groundwater.
- Water pollution includes surface water pollution and groundwater pollution.
- Surface water pollution is caused by the run-off of mobile herbicide residues.
- The lateral movement of herbicide in surface water away from the target site can occur when application are followed immediately by heavy rains.
- Groundwater pollution is caused by leaching loss of herbicides. They are not caused by a vast majority of herbicide.

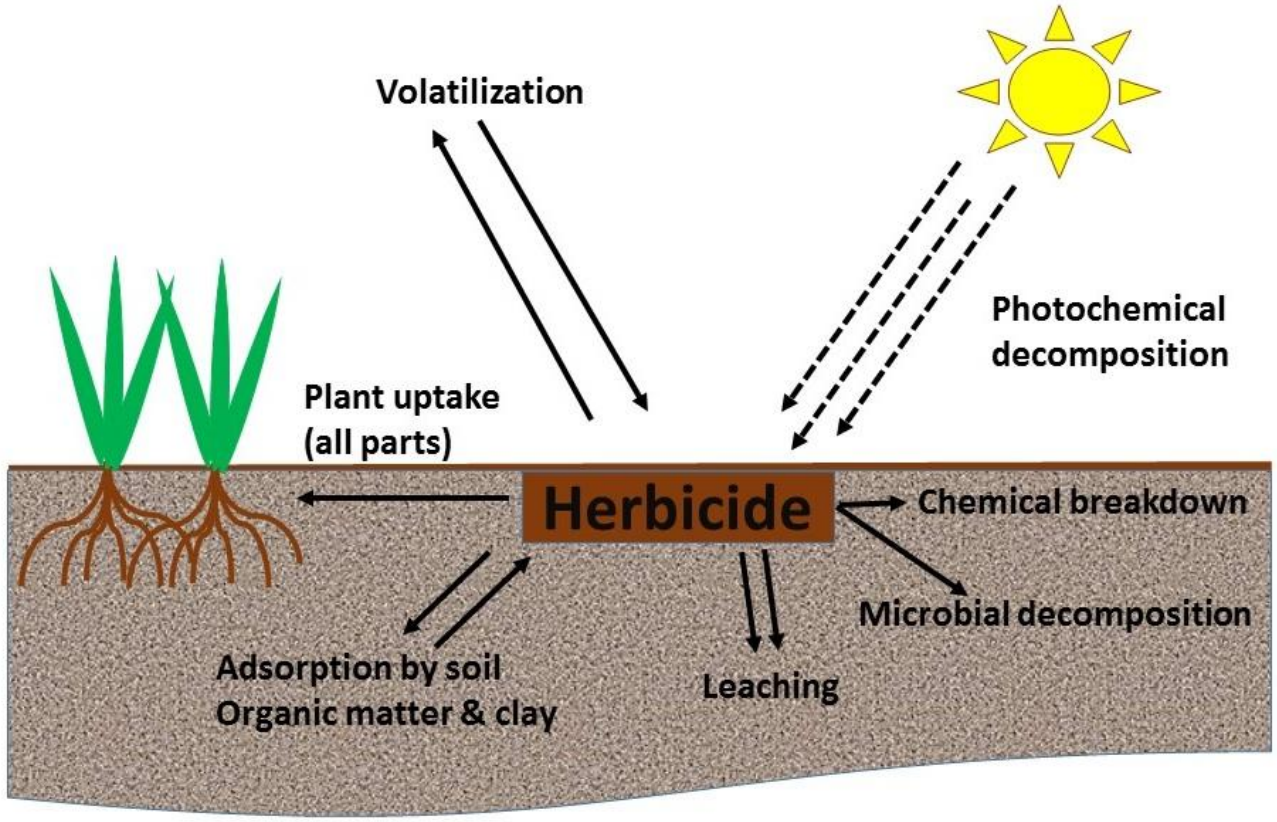


Air pollution

- Air pollution is much more concerned with herbicide which are applied on foliage of plants and subjected to photodecomposition followed by volatilization.
- The end products are mixed with atmosphere and polluted the air.

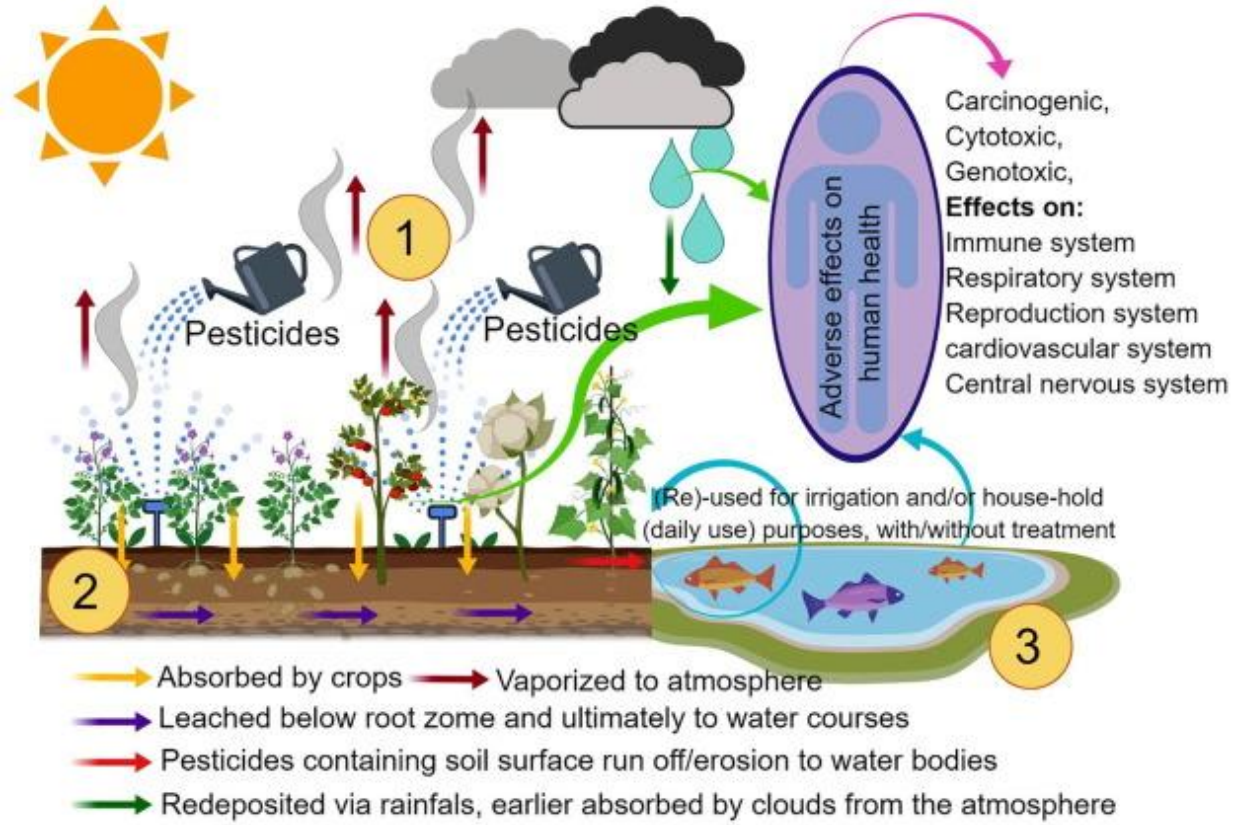
Soil pollution

- The herbicide residues adsorbed or absorbed with/by soil and pollute it.
- Continuous application of herbicides to crop field in the intensive cropping system may lead to residual accumulation in soils.



Hazard to human or animal health

- Sometimes herbicide residues may be associated with food chain which indirectly affects human health when we take contaminated foods.
- Herbicide may also directly affect on human health by showing their acute toxicity (injury or illness shortly after application) or chronic toxicity (symptoms caused by repetitive exposure for extended period)
- Herbicide residues in food chain may cause carcinogenicity (capacity to produce cancer) in human body.



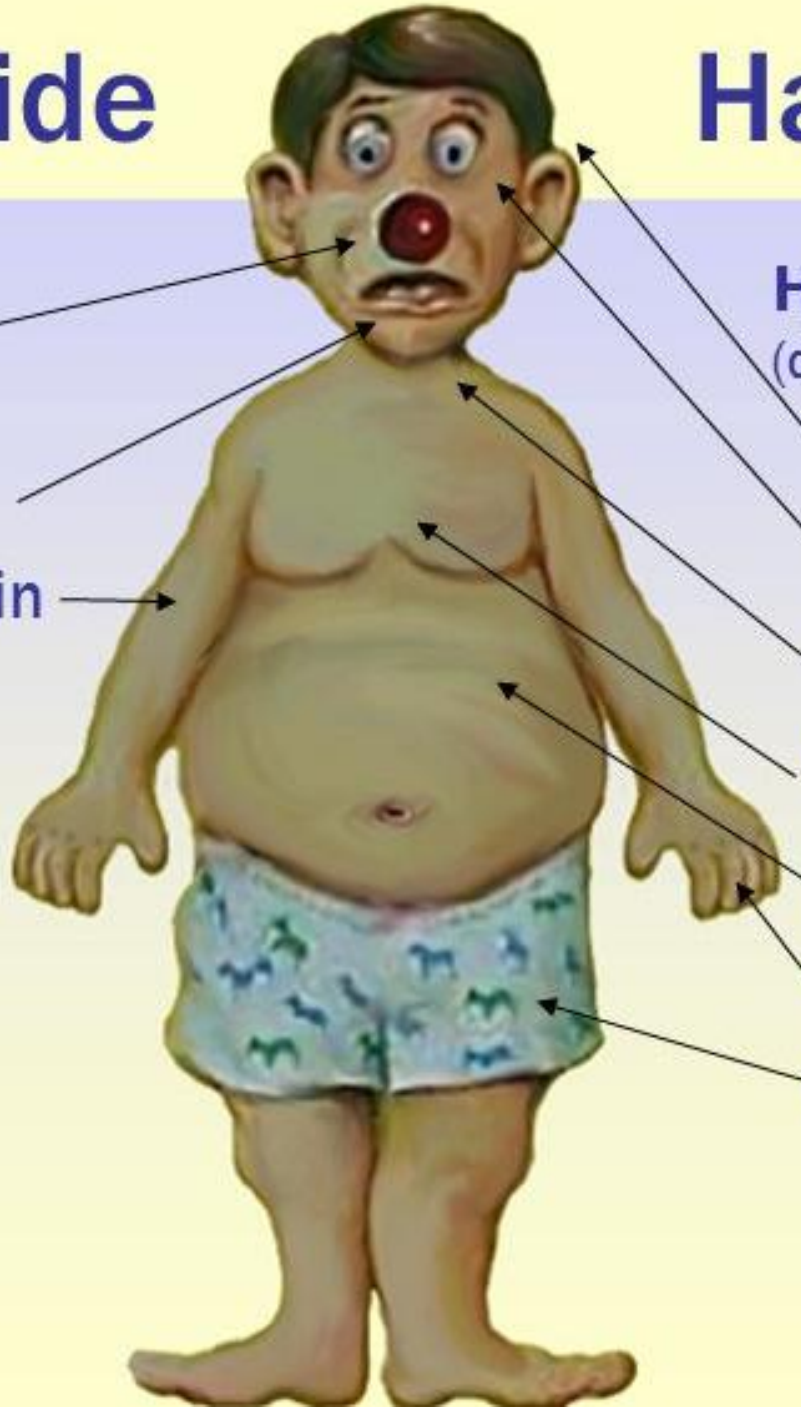
Pesticide Hazards

How pesticides get in

- Inhalation
- Through food or water
- Absorption through skin

Exposure levels

- Chronic exposure
- Acute exposure



Health effects
(depends on specific pesticide)

- Central nervous system
- Eye irritation
- Hormone imbalance
- Cancer
- Liver damage
- Skin irritation
- Reproductive effects

Shocking Study Shows Glyphosate Herbicides Contain Toxic Levels of Arsenic

Posted on Jan 8 2018 - 12:24am **by** Sustainable Pulse

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A shocking new study published in Toxicology Reports has shown that the current regulatory assessments of the world's most used herbicides are wrong, with ingredients such as arsenic being regularly found in Glyphosate based herbicides and other pesticides at toxic levels.

Glyphosate's toxicity is currently being debated at an international level by regulatory and health authorities, but other formulants in Glyphosate-based herbicides (such as Monsanto's Roundup), are rarely considered. The formulants used with glyphosate are declared as inert and confidential by the pesticide industry.

> **Find the full peer-reviewed paper here.**

Prof. Gilles-Eric Séralini from the University of Caen Normandy, France, and his colleagues Dr. Nicolas Defarge and Dr. Joël Spiroux, have discovered several new findings which crush the pesticide industry's claim that the 'inert' ingredients in glyphosate-based herbicides do not need regulating:

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Skin manifestations of chronic arsenic poisoning. (**a**) Palms and fingers: Punctate and diffuse keratosis. (**b**) Palms and fingers: Punctate keratosis on right hand and Bowen's carcinoma on the left hand. (**c**) Dorsum of foot: Diffuse and punctate pigmentation. (**d**) Sole: Severe punctate keratosis. (**e**) Chest: Diffuse pigmentation and punctate leukoderma. (**f**) Forehead: Multiple Bowen's disease

Chapter 3

Phytotoxicity, environmental and health hazards of herbicides: challenges and ways forward

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3.1 Introduction

Weeds are the greatest threats for crop production and one of the major biotic stresses, which drastically hamper crop growth and productivity. Due to the pernicious nature, weed control becomes a difficult task by the farmers, and various tools are used, which includes mechanical, physical, biological, and chemical control.

However, with the emergence of the Green Revolution, the chemical

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