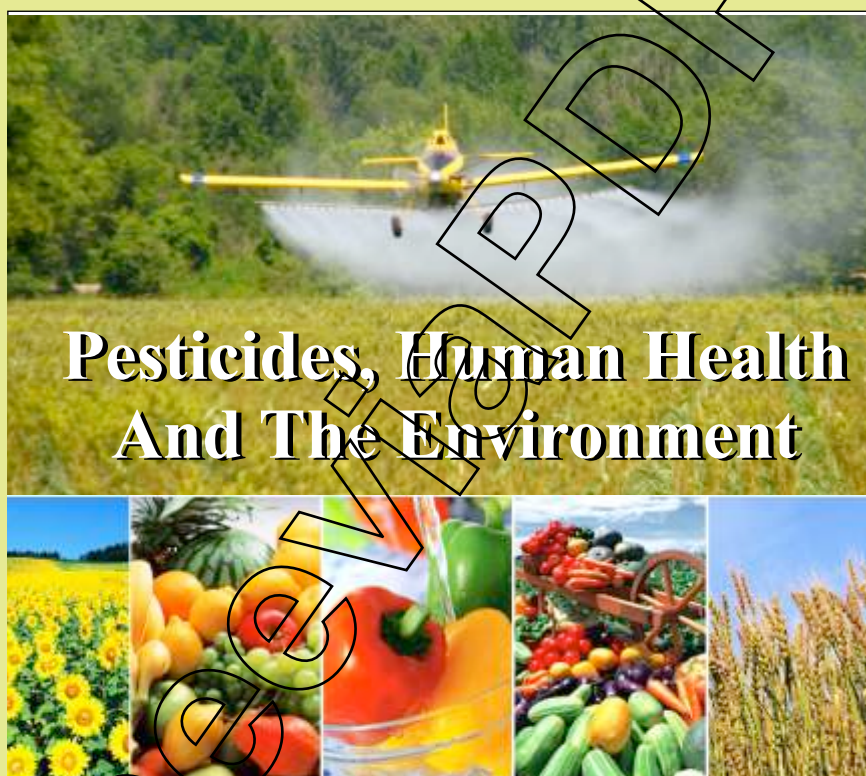




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April - June 2011



Pesticides, Human Health And The Environment

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ENVIS Centre on:

Eco-labelling and Eco-friendly Products

Foreword

Rachel Carson in 1962 introduced the concept of biological methods to control pests. She is an author of "Silent Spring" a famous book on synthetic pesticide that causes environmental problems. This book is widely credited to provide support for the launch of environmental movement.

There is an emerging consensus that modern petrochemical-based farming is unsustainable and there is a need to develop and promote ecological approaches to food production. Biotechnology offers a great scope to do this. The most obvious and apparently environment-friendly alternative to pesticides is to follow the naturally occurring biological approaches. Bio chemicals used as pesticides are environmentally safe, selective and specific in action and biodegradable. Cost and time of production of bio pesticides are cheap as compared to chemical pesticides.

Many plant species have been reported to possess pesticidal and pest growth inhibiting properties, but their potential remains untapped by the industry. To increase environmental awareness, many countries have made very clear political decision and decided to minimize the hazards and risk to health and the environment caused by the chemical pesticides. The EU directive states, "when pesticides are used, appropriate risk management measures should be established and low-risk pesticides as well as biological control measures should be considered in the first place." Biological control comprises various technologies of which one option is the use of botanical products. Many kinds of plant species and technologies have been used in the production of botanical pesticides.

The use of chemical pesticides in Indian agriculture has seen a sharp increase in initial years, and in some areas reached alarming levels with grave implications for human health, the ecosystem, and ground water. Now India has successfully reduced pesticide consumption without adversely affecting the agricultural productivity. This was facilitated by appropriate policies that discouraged pesticide use, and favoured IPM application.

In the future the use of pesticides will be tightly regulated because of well-documented environmental risks in the use of chemical pesticides. Demand for green pesticides – plant based products will increase because of its biodegradability nature. Green pesticides may have an important role as pesticides in the modern world.

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Pesticides & Its Effect



Pesticides kill pests, which are detrimental to humans as they plague agriculture production. Pesticides therefore help protect crops from pests such as weeds, fungus, and bacteria by killing the pests that spread diseases including dirty bugs such as flies. In pools, pesticides are used to keep algae and microorganism growth out. Sometimes used on clothes to keep moths away; sometimes used in food we eat. Safe and judicious use of pesticides not only protects environment, it helps farmers to achieve sustainable agricultural growth.

Pesticides can be classified as biological and chemical. Biological pesticides can be developed using fungi, bacteria, and other organically present substances. Some biological pesticides are microorganisms that, without any manipulation, demonstrate natural effectiveness in targeted pest control. These generally are not toxic to humans or animals and do not leave a persistent residue. The greatest risk to our environment and our health comes from the chemical pesticides. The benefits of the proper use of pesticides are enormous. Nevertheless, there are significant risks associated with widespread and intensive use of pesticides. Improper use, handling, or storage of pesticides can harm human health, adversely affect non-target organisms, develop pesticide resistance in many major pests, and environmental contamination of air, soil, and water.

Effects of Pesticides on Health

Pesticides are intended to be toxic to the target pest. They are not always "safe." They pose potential risks to human beings and other living organisms. It poses several different kinds of threats to health. These adverse effects are commonly considered as either "acute" effects developing quickly after exposure but of usually short duration, or "chronic" effects may appear after a delay, often years, but then persist for extended periods.

Pesticides enter our body during mixing, applying, or cleanup operations. There are generally three ways

pesticides can enter the body:

- Dermal - through skin
- Inhalation – through the lungs
- Ingestion- by mouth

Injurious chemical used in the pesticide can harm human health. For instance, organophosphates and carbamates, affect the nervous system (nerves and muscles). Others may irritate the skin or eyes. Some pesticides may be carcinogens. Others may affect the hormone or endocrine system in the body. Most often, pesticides affect the nervous system.

People get exposed to the pesticide through indoor and outdoor use and from food also. Highest levels of pesticide exposure are found in farm workers, pesticide applicators, and people who live adjacent to heavily treated agricultural land and pesticide industries across the world. Because farmers and farm workers directly handle 70-80% of the pesticides they use, they are at the greatest risk of exposure.

Effects on Nervous System

When people are exposed to pesticides, which are neurotoxins, they may feel giddy, confused, and may have problems with muscle coordination. Sometime ability to think goes down. These are short-term effects. When exposed over a long period pesticides harm IQ and learning ability. Prolonged exposure to pesticides may cause permanent damage to brain and thought to be linked to Parkinson's disease.

Effects on Reproductive System

People working with pesticides have an increased risk of fertility problems like miscarriages and spontaneous abortions. Women in their early pregnancy get exposed to pesticides have an increased risk of a baby with birth defects. Hormonal disruption is also linked with pesticide exposure that causes reproductive cancers.

Effects on Respiratory System

There is an association between asthma and use of pesticides. Children are more vulnerable to the effects of pesticides and other pollutants.

Cancer

People who work with pesticides have a higher risk of having different types of cancers like leukemia, kidney, brain, testicular, prostate and cervical cancers, and Non-Hodgkin's Lymphoma (NHL).

General Symptoms that Might Indicate Pesticide Poisoning

Mild Poisoning	Moderate Poisoning	Severe Poisoning
Any of the following	Any of the mild symptoms, plus any of the following	Any of the mild or moderate symptoms, plus any of the following
Irritation of the nose, throat, eyes or skin	Vomiting	Inability to breathe
Headache	Excessive salivation	Extra phlegm or mucous in the airways
Dizziness	Coughing	Small or pinpoint pupils
Loss of appetite	Feeling of constriction in throat and chest	Chemical burns on the skin
Thirst	Abdominal cramps	Increased rate of breathing
Nausea	Blurring of vision	Loss of reflexes
Diarrhoea	Rapid pulse	Uncontrollable muscular twitching
Sweating	Excessive perspiration	Unconsciousness
Weakness or fatigue	Profound weakness	Death
Restlessness	Trembling	
Nervousness	Muscular incoordination	
Changes in mood	Mental confusion	
Insomnia		

Source: http://www.ccohs.ca/oshansyserv/chemicals/pesticides/health_effects.html

Pesticides as Health Disaster

For years government and international institutions have presided over globalization and industrialization and the political will has also opened the doors to monopolization and concentration of resources and productive processes in the hands of a few giant corporations. The imposition of intensive, externally dependent models of production has destroyed not only the environments and livelihood of communities but also the lives of human beings. Widespread environmental degradation with significant adverse human health consequences continues to occur throughout India.

Bhopal Gas Tragedy

Hundreds died from the effects of toxic gases leaked from a chemical factory in Bhopal, Madhya Pradesh. The accident happened on December 3rd 1984 at the American-owned Union Carbide pesticide plant. It was one of the world's worst

catastrophes. A leak of methyl isocyanate gas and other chemicals from the plant resulted in the exposure of hundreds of thousands of people. The gas and other toxic substance spread around the locality nearby. Immediate death toll was 3,787 as per Madhya Pradesh Government and causing significant morbidity and premature death for many thousands more. A government affidavit in 2006 stated the leak caused 5,58,125 injuries including 38,478 partial and 3,900 severe and permanently disabling injuries. The tragedy not only struck people staying around the factory but the environment too as toxic wastes started seeping into groundwater in the adjoining areas from the day the plant began manufacturing. The people of the area are still subjected to a "double whammy of diseases", first because of the gas leak and ground water contamination. The Indian Supreme Court has mediated a settlement, UCC accepted moral responsibility and agreed to pay \$470 million to the Indian government to be distributed to

claimants as a full and final settlement. Recently United States-based Union Carbide Corporation has filed a petition in the Supreme Court demanding early hearing on the government's curative petition in the Bhopal gas disaster case, saying delays are being used to besmirch the reputation of its parent firm, Dow Chemicals.



chains, and can travel long distances. Now it is a major health burden in southern India. Many children are born with severe disabilities, probably caused by the toxic effects of endosulfan.

Kasargod-Endosulfan Disaster

Endosulfan is a pesticide used against a broad spectrum of insects and mites in agriculture sector. It is used to protect mainly agriculture produce. It is a highly toxic and pollutant that causes long term harmful effects on humans and wildlife. It has already been banned in over 75 countries, but India is the largest producer, consumer, and exporter of Endosulfan. This pesticide is considered as Persistent Organic Pollutant (POP) and is absorbed by stomach, lungs, and through skin. US Environmental Protection Agency (EPA), World Health Organization (WHO), United Nations Environment Program (UNEP), Industrial Toxicological Research Center (ITRC) in India, and European Union (EU) have classified it as highly hazardous chemical. Spraying of endosulfan aerially on plantation has disastrous impact on health and environment. Endosulfan damages central nervous system and induces hormonal changes in mothers and babies, as well to higher levels of skin complaints, epilepsy, congenial anomalies, mental retardation, and cerebral palsy. Its aerial spraying on cashew plantation has affected the people of Kerala. Kasargod district of Kerala and neighbouring Dakshina Kannada are bearing the brunt of spraying of endosulfan. Kerala has banned the pesticide but victims of Karnataka are still facing the threat. Being POP, it is resistant to environmental degradation. They accumulate in the fatty tissues of living organisms and food

Pesticide Disaster in Mississippi

Unlicensed pest control operators sprayed pesticide methyl parathion in more than 1,500 homes and business in Mississippi for over two years during 1995-96. Methyl parathion is used for agricultural crop under restricted conditions. It is strictly prohibited for the indoor use. It is a potent neurotoxin and easily absorbed by humans. It is linked to a varied health effects including reproductive and endocrine-disrupting effects. Parathion is banned in 14 countries.

Pesticide Disaster in Mexico

An insecticide factory in Córdoba, a city of Mexico, caught fire and exploded on May 3, 1991. The accident released toxic chemicals. Although there were no immediate deaths, a toxic cloud bearing dioxins covered the city and also polluted the groundwater. The number of acute poisonings were numerous and included classical cases of convulsions and tremors. It affects nervous system, respiratory system, and dermatological system.

These are few examples. Widespread use of pesticides in plantations is causing not only health disasters but also affecting the environment. These disasters indicate a need for enforceable international standards for environmental safety, preventative strategies to avoid similar accidents, and industrial disaster preparedness.

ECO NEWS

Eco friendly Pesticides

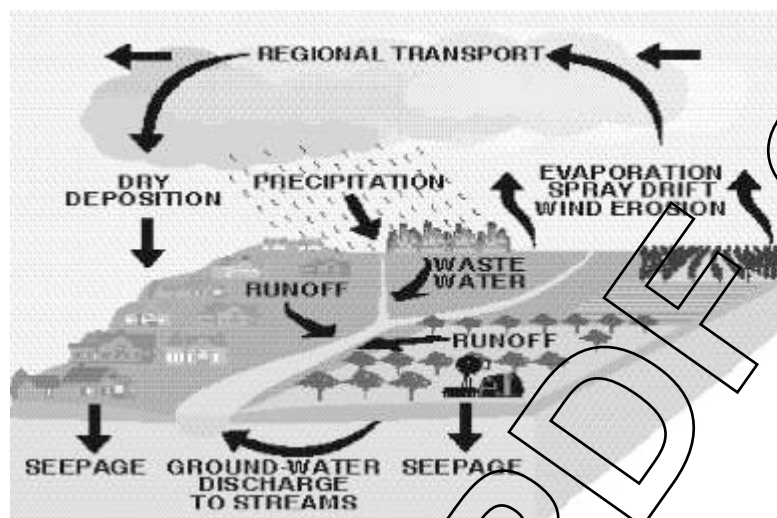
Indian Oil Corporation (IOCL) has created cost-effective, biodegradable spray oil for killing pests in farms. In India most of the pesticides or insecticides, which are in use, are imported and are chemical-based. To maintain the quality of their yield and kill pests farmers have no solution but to use these pesticides. It costs a lot to them per annum and in many cases damages their health also. The R&D center of IOC has developed an eco-friendly substitute to these detrimental but essential pesticides used by farmers across the Indian agricultural land. The Faridabad based center in Haryana has discovered the biodegradable spray oil- Servo Agro Oil- for pest and disease management. Mr. RT Mookan of IOCL says, "Though the use of chemical pesticides might result in an increased yield and control of unwanted diseases and insects, they prove to be more harmful in the end as they leave chemical toxic residues in the crops and pollute the adjacent soil, water, and air." The presence of such residues also affects the export of

such crops to other countries, thus affecting the business of the farmers in India. Not only this, according to Mookan, prolonged "use of these kinds of chemical sprays in agricultural lands leads to resistance of pests to these products and even outbreak or resurgence of secondary pests." Servo Agro Oil is oil based but has inherent biodegradable constituents with no harmful chemicals and no possibilities of leaving behind chemical residues in the food that is meant for consumption. Since the Servo Agro Oil has been developed in an Indian lab, it proves to be more cost-effective for Indian farmers than buying imported pesticides. And as the oil doesn't have dangerous chemicals, the spraying is easier, not requiring a worker to wear any kind of goggles or gloves or take any other extra precaution or even worry about the after effects.

Source:

<http://www.technologyreview.com/energy/26857/>

Environmental Impact of Pesticides



Pesticides are used for the benefits of the humankind in the area of forestry, public health, and agriculture. In agriculture it increases the productivity manifolds.

The purpose of applying pesticides on plantations is to suppress weeds and animal pests and to protect agricultural and industrial products. However, the majority of pesticides not only target weeds and pests they also affect plants and animals. Frequent application of these pesticides leads to loss of biodiversity. Many pesticides are not easily decomposable and they remain in the soil, leached to ground- and surface- water and contaminate the environment. These pesticides can enter the organism depending on their chemical properties and bio-accumulate in food chains. Consequently these affect human health. Intensive application of pesticides results in several negative impacts on the environment that cannot be ignored.

Soil Contamination

Pesticides and herbicides enter the soil via aerial spray during foliage treatment, wash-off from treated foliage, release from granulates or from treated seeds in soil. Some pesticides such as soil fumigants and nematocides are applied directly into soil to control pests and plant diseases. The transport, persistence, or degradation in soil depends on chemical properties of pesticides and also physical, chemical, and biological properties of the soil. All these factors affect sorption/ desorption, volatilisation, degradation, up take by plants, run-off, and leaching of pesticides.

Ground Water Contamination

Pesticides and herbicides can get into water via flow during pesticide spraying, by runoff from treated area, and leaching through the soil. Pesticides also applied directly onto water surface e.g. for control of mosquitoes. Water contamination

depends mainly on nature of pesticides (water solubility, hydrophobicity), soil properties, weather conditions, landscape, and also on the distance from an application site to a water source. Rapid transport to groundwater may be caused by heavy rainfall shortly after application of the pesticide to wet soils. Once it is contaminated with toxic chemicals, it takes years to clean up and it is very costly and complex.

Effects on soil and water organisms

Soil microorganisms, invertebrates (nematodes, earthworms), and other soil species play an important role in maintaining soil structure, transformation and mineralization of organic matter, producing nutrients available for plants. These organisms also degrade many pollutants and pesticides and thus are of great concern for using in biotechnology. Degradation of these organisms can lead to formation of more toxic and persistent metabolites. These soil populations are highly flexible and adaptable to changing environmental condition. Application of pesticides can cause irreversible changes in population. Inhibition of species, which provide key process, can have a significant impact on function of whole terrestrial ecosystem.

Pesticides also affect water organisms – invertebrates, amphibians, fishes- when it enters fresh water streams either via direct spray or surface runoff or drain flow. Lethal effects of these toxic contaminants change the ecology of water bodies.

Effects on non-target species

Repeated application of pesticides during farming bees, butterflies, and farmland birds are also affected. It affects their populations. They act as wild pollinators in the field. Intensive usage of pesticides decreases habitat heterogeneity and has impact on biodiversity.

Green Pesticides

The concept of "Green Pesticides" refers to all types of nature-oriented and beneficial pest control materials that can contribute to reduce the pest population and increase food production. Green pesticides are also known as ecological pesticides and derived from organic sources. These are eco-friendly and cause less harm to human and animal health, and to habitats and the ecosystem. They are more compatible with the environmental components than synthetic pesticides. Pesticides used for agricultural purposes are evaluated for minimal adverse environmental effects. These are used in the form of sprays or dusts. Many green pesticides are biological pesticides but others are minerals or chemical compounds.



Bio-pesticides are derived from natural resources like animals, plants, bacteria, and certain minerals. Botanical based pesticides are organically compliant are extracted from the parts of plant. These are non-persistent and decomposed rapidly in the environment. Essential oil based pesticides are generally used against garden and home pests. These 'green pesticides' are also effective in agricultural situation especially for organic food production.

As per US Environmental Protection Agency, there are approximately 195 registered bio-pesticide active ingredients and 780 products.

India has so far secured only 19 patents in bio-pesticides and 12 types of pesticides are registered under Insecticides Act. Neem based pesticides, *Bacillus thuringiensis*- soil dwelling bacteria, NPV (nucleo polyhedron virus), and *Trichoderma* (fungal strains) are the major bio pesticides used and produced in India. Most of the biopesticides used for public health except a few in agriculture. Transgenic plants and beneficial organisms bio agents are used for pest management in India. In India a number of biopesticides production units and plants have established in recent years. As a result the use of biopesticides and bio agents in India is rising but still it has not reached the desired level. These are cheaper than chemical pesticides. Besides being eco-friendly, they do not pose risk of resistance development. Consumption of biopesticides has increased from 219 metric tons in 1996-97 to 683 metric tons in 2000-01, and about 85% of the biopesticides used are neem-based products. Consumption of chemical pesticides has

significantly fallen from 56,114 MT to 43,584 MT during the same period.

Bio-pesticides fall into three major classes:

Microbial pesticides consist of a microorganism-bacterium, fungus, virus or protozoan as the active ingredient. It can control many different kinds of pests. To target specific pests each pesticide has separate active ingredient. For example, there are fungi that control certain weeds, and other fungi that kill specific insects.

Plant-Incorporated-Protectants (PIPs) are pesticidal substances produced from the genetic material of the plants that has been added to the plant to produce substance to protect plant from pests. For example, scientists can take the gene for the Bt pesticidal protein, and introduce the gene into the plant's own genetic material. Then the plant, instead of the Bt bacterium, manufactures the substance that destroys the pest. EPA regulates the protein and its genetic material of the plant but not the plant itself.

Biochemical pesticides are naturally occurring substances that control pests by non-toxic mechanisms. Biochemical pesticides include substances, such as insect sex pheromones, that interfere with mating, as well as various scented plant extracts that attract insect pests to traps.

Source:

<http://www.nistads.res.in/indiasnt2008/t6rural/t6rur17.htm>

<http://www.epa.gov/pesticides/about/types.htm>,

<http://www.scribd.com/doc/49868791/Bio>

Sustainable use of Pesticides and Integrated Pests Management

To reduce risks of pesticide usage on environment and human health, and to attain a more sustainable use of pesticides and an overall reduction in risks and use many countries have adopted a series of measures. A great emphasis is given on plant health and plant protection policies across the world. EU has established a new framework to “achieve a sustainable use of pesticides by promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives”

EU adopted the Directive on the sustainable use of pesticides in 2009 (Directive 2009/128/EC of 21 October 2009) and the new legislation on pesticides solicits EU member states to establish so-called National Action Plans (NAPs) on the sustainable use of pesticides to be transposed in to national law by 2012. According to new directives, the most important measures to reduce pesticide dependency are:

- Implementation of Integrated Pest Management (IPM) by all EU farmers from 2014
- Priority to non-chemical alternatives
- Pesticide use should be minimized or prohibited in specific areas
- Establishment of buffer zones to protect non-target organisms and safeguard zones for surface- and ground- water for the abstraction of drinking water, where pesticides should not be used or stored

EPA and the states' agriculture office register or license pesticides for use in the United States. Before a pesticide can be marketed and used in the United States, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that EPA evaluate the proposed pesticide to assure that its use will not pose unreasonable risks of harm to human health and the environment. This regulation involves an extensive review of health and safety information.

In India, the Ministry of Agriculture regulates the manufacture, sale, transport and distribution, export, import and use of pesticides through the 'Insecticides Act 1968' and

the rules framed there under. The production of biopesticides is also controlled by the same regulations as applicable to that of chemical pesticides.

Integrated Pest Management (IPM) is an approach that promotes a safer and more sustainable management of pesticides. Many farmers who believe in sustainability rely upon IPM as an alternative to the use of pesticides. IPM is a growing movement to incorporate techniques to eliminate pests with minimum impact on environment. An IPM field grows pest resistant variety of crop, use predatory insects to kill plant-eating pests, use mechanical pet traps, and remove nesting areas by ploughing under harvested crops. Natural and chemical pesticides are used as a last option.

To address the issues on usage of chemical pesticides and its impact on environment and health, an alternative approach to manage agriculture known as Community Managed Sustainable Agriculture (CMSA) is being tested and practiced in the state of Andhra Pradesh in India. This approach replaces the use of chemical pesticides with combination of physical and biological measures—including green bio-pesticides—and complements it by adopting biological and agronomic soil fertility improvement measures leading to reduced use of chemical fertilizers. It reduces the cost of cultivation. CMSA technologies are a blend of scientifically proven methods, indigenous knowledge, and traditional wisdom. It replaces the use of conventional chemical fertilizers and pesticides with environment friendly techniques that includes use of microbial formulations, composting techniques, vermiculture, and bio fertilizers. CMSA is based on the premise that ecologically sustainable agriculture makes sound economic sense.

Ministry of Agriculture and the Indian Council of Agricultural Research (ICAR) are committed for the development and promotion of IPM in India. They are providing safe and effective technologies to protect crops against unacceptable losses due to pests, weeds, and diseases.

ECO NEWS

Call for Global ban on Bee killing Pesticide

Agricultural experts and scientists from all over the world raised their voice for banning the pesticide – neonicotinoids linked to bee death and causing Colony Collapse Disorder (CCD). CCD is a syndrome characterized by the sudden loss of adult bees from the hive.

This chemical pesticide is sprayed on the plants and it coats the surface of a plant's leaves and stems. Even it is absorbed by plant and circulates inside the flower plants. When bees move on these plants and sucks nectar, they come in contact of the pesticide. The amount of pesticide sprayed on the plants is considered to be 'safe' for plants but it affects the health of entire bee colonies.

Recent research studies published in the 'Science' journal confirm that

even exposure to the neonicotinoid causes them to lose their way when out foraging.

Many food crops are pretreated or sprayed with this pesticide. It leads to the contamination of pollen and nectar that bees collect. Even low doses can impair bees' navigation abilities; reduce the growth of bee colonies, and the number of new queens. So as per studies this pesticide is the main culprit for the dramatic declines in domestic honeybees, *Apis mellifera*, as well as native wild bee populations.

You can help support this effort by signing the following petition:
<http://org2.democracyinaction.org>

Source: http://www.naturalnews.com/035652_pesticides_honey_bees_ban.html

Safe Use of Pesticides



Pesticides are toxic but are not really hazardous if suitable precautions are taken. Most pesticides affect adversely if accidentally or intentionally ingested or are in contact since long time. The particles may be inhaled while spraying and contaminate with water, food, or soil. Precautions should be taken while transporting, storing, or handling also.

Using pesticides safely depends on factors like appropriate selection of product and its label directions.

Reading Pesticide Labels

The label tells how to use pesticides effectively and how to protect yourself, children, pets, and even the environment from harm. It informs how to use the product correctly and legally. Labels contain detailed information on potential hazards associated with the products and instructions should follow in the incident of poisoning or spill. Pesticide labels answer many more questions like ingredient, toxicity, safety, first aid information, personal protective equipment, manufacturers contact information, and storage and disposal. Label instruction will allow minimizing the risk and maximizing the benefits.

In addition to reading and following the label directions, consider these tips when using pesticides:

Make sure kids, pets, and anyone non-essential to the application is out of the area before mixing and applying pesticides.

Be sure to wear clothing that will protect you when using pesticides. Consider wearing a long sleeve shirt, long pants, and closed-toe shoes in addition to any other protective clothing or equipment required by the label.

Mix pesticides outdoors or in well-ventilated areas.

Mix only what you need to use in the short term to avoid storing or disposing of excess pesticide.

Be prepared for a pesticide spill. Have paper towels, sawdust, garbage bags, and non-absorbent gloves on hand to contain the spill. Avoid using excessive amounts of water, as this may

only spread the pesticide and could be harmful to the environment.

Read the first aid instructions on the label before using the product. Have the telephone number for the Poison Control Center available in case you have additional questions. Visit http://www.searo.who.int/en/Section23/Section1725_7461.htm#India

Remove personal items, such as clothing, or tools from the spray area to avoid contamination.

When spraying pesticides indoors, make sure the area is well ventilated.

When applying pesticides as a spray or dust outside, avoid windy conditions and close the doors and windows to your home.

After using pesticides, wash your hands thoroughly.

Understanding Pesticide Risks

Pesticides not handled properly are dangerous and can pose risks to people, pets, or the environment. The risk depends on how much exposure and how poisonous. Even low in toxicity but exposure is high it can be hazardous. To estimate the toxicity of a product look at the signal word. These will have either the word CAUTION, WARNING, or DANGER on the label. These signal words depict the toxicity of the product:

- CAUTION represents the lower toxicity products
- WARNING indicates medium toxicity products
- DANGER stands for the highest toxicity products

Minimizing Pesticide Risks and Exposure at Work and at Home

Exposure of the pesticides can make people sick. All pesticides have some level of risks. Risk depends on the amount of exposure and level of toxicity. Even very low amount inhaled for long time can be hazardous.

Tips for Minimizing Pesticide Risks:

Adopt Integrated Pest Management (IPM) approach.

Select the product with low toxicity after reviewing the signal word and active ingredients.

Select products with formulations least likely to lead to exposure.

Follow the label instructions religiously.

Consider using additional protective equipment to decrease exposure even further.

Frequently washing the pesticide off chemical resistant clothes, like aprons, boots, and gloves.

Remove shoes before entering house, take a shower immediately, and clean work clothes to reduce exposure to family.

Avoid allowing children, pets, or sensitive people in treatment areas to prevent accidental exposures during pesticide applications.

Consider staying out of treated areas after an application for the amount of time listed on the label directions.

If you want to report a workplace concern, call National Poison Information Center (NPIC) or contact your local agency. Visit <http://www.aaiims.edu/aaiims/departments/NPIC/NPICIntro.htm>

Pesticide Storage and Disposal

For storing pesticide three points should keep in mind –

- Storing in their original container. Design and material of container withstands the chemical and protect the product.
- Store the container in temperature mentioned in the label. Temperature can change the chemistry of the product and also damage the container.
- Store the container in designated place. Preferably in ventilated place away from children, pets, flames, and food. Choose a location away from water bodies.

For disposal of pesticides-

- Follow the instructions given on label. Try to use mixed or diluted pesticides up following the label. Many mixtures do not remain stable for long.

Source: <http://npic.orst.edu/health/safeuse.html>

LIST OF PESTICIDES / PESTICIDES FORMULATIONS BANNED IN INDIA

A - Pesticides Banned for manufacture, import and use

- | | |
|--------------------------|---|
| 1 Aldrin | 18 Tetradifon |
| 2 Benzene Hexachloride | 19 Toxafen |
| 3 Calcium Cyanide | 20 Aldicarb |
| 4 Chlordane | 21 Chlorobenzilate |
| 5 Copper Acetoarsenite | 22 Dieldrine |
| 6 Clbromochloropropane | 23 Maleic Hydrazide |
| 7 Endrin | 24 Ethylene Dibromide |
| 8 Ethyl Mercury Chloride | 25 TCA (Trichloro acetic acid) |
| 9 Ethyl Parathion | 26 Metoxuron |
| 10 Heptachlor | 27 Chlorofenvinphos |
| 11 Menazone | 28 Lindane (Banned vide Gazette Notification No S.O. 637(E) Dated 25/03/2011)-Banned for Manufacture, Import or Formulate w. e.f. 25th March 2011 and banned for use w.e.f. 25th March 2013 |

B - Pesticide / Pesticide formulations banned for use but their manufacture is allowed for export

- | |
|-----------------------|
| 1 Nicotin Sulfate |
| 2 Captafol 80% Powder |

C - Pesticide formulations banned for import, manufacture and use

- | | |
|-----------------------|---------------------|
| 1 Methomyl 24% L | 2 Methomyl 12.5% L |
| 3 Phosphamidon 85% SL | 4 Carbofuron 50% SP |

D - Pesticide Withdrawn

- | | |
|------------------------------|-------------------|
| 1 Dalapon | 2 Ferbam |
| 3 Formothion | 4 Nickel Chloride |
| 5 Paradichlorobenzene (PDCB) | 6 Simazine |
| 7 Warfarin | |

Pesticides Restricted For Use in India

Aluminium Phosphide
DDT
Lindane
Methyl Bromide
Methyl Parathion
Sodium Cyanide
Methoxy Ethyl Mercuric Chloride (MEMC)
Monocrotophos
Endosulfan
Fenitrothion
Diazinon
Fenthion
Dazomet

Source: http://www.cibrc.nic.in/list_pest_bann.htm

www.neoviaPDF.co

Source: http://ppqs.gov.in/Ipmppest_main.htm

Environmental Labels World - Wide

 <p>India E-mail: cpcb@alpha.nic.in or cpcb@sansad.nic.in Homepage: envfor.nic.in/cpcb/ecomark/ecomark.html</p>	 <p>France E-mail: patricia.proia@afnor.fr Homepage: www.afnor.fr/portail.asp?Lang=English</p>
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