



## A REVIEW

# Impact of pesticides on agro products, health and environment

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**Abstract :** Pesticides are substances used by human being to kill or deter organisms (pests) that threaten our health and wellbeing of pets and livestock or cause damage to crops. Antibiotics in the medical sense are excluded, but included are insecticides, herbicides, fungicides, molluscicides and rodenticides among others. Of these, insecticides (to control insects) and herbicides (for controlling unwanted vegetation) are used in the largest quantities. They are also concerned that birds, fish and other beneficial organisms may be adversely affected by pesticides. The insecticidal activity of some naturally occurring compounds such as nicotine and pyrethrum derived respectively from the tobacco plant and certain chrysanthemum species has been known for centuries. These have since been supplemented by inorganic compounds for insect control and sulphur and copper based compounds for fungus control. Discovery of the insecticidal activity of a number of synthetic organic compounds such as Organochlorines like Dichloro-diphenyl trichloroethane (D.D.T.). Benzene Hexachloride (BHC) already synthesised as chemicals in the previous century.

**Key Words :** Pesticide, Prevention of crops, Farming

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## INTRODUCTION

India is a country where about 70% people are dependent on agriculture and other related work for their livelihood. However, farmers are facing a lot of problems now a days because of several factors such as not getting proper price of agricultural products, natural disasters, abnormal weather etc. On the other hand, using more and more chemical fertilizers in agricultural activities is causing several types of diseases, the younger generation is drifting away from farming and are addicted to drugs, alcohol etc. This situation is dangerous for the future of our society and country.

The use of pesticides in agriculture has further increased due to fast growing human population which is estimated to reach 8.5 billion by 2030, hence the fear of the impact of this population on food security. On a global scale, the average usage of acaricides, fungicides and herbicides was 353,000, 566,000 and 342,000, respectively. The highest users of pesticides are Europe, followed by China and then the United States of America. For African countries, the usage makes up about 25% with most common cases in the cultivation of vegetables. One of the prominent reasons for the use of Chemical substances in agricultural farmlands is for the protection of crops from various pests, thereby boosting the overall

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agricultural yield and productivity.

The essence of pesticides application is for the control of varieties of weeds, disease causing organisms and pests that are capable of causing damage to plants. Pesticides are therefore biocidal in nature and when applied to plants, they eventually come into contact with man through crops.

### **Concept of pesticide residues:**

According to WHO, pesticides residue refers to any chemical substance or a combination of substances present in food for animals or man that comes from the application of pesticides including various derivatives like conversion and degradation products, impurities and metabolites that have toxicological significance.

The impact of pesticide application on the overall yield of crops is remarkable. The application is usually done prior to the growing process as well as after harvesting of the crops. The residue of pesticides in the produce constitutes serious harms to man and other organisms. The variation in the quantity of pesticides applied during farming calls for the need to continually assess their presence in food.

### **Distribution of pesticides residues in different food:**

There are different routes through which humans get exposed to pesticides from food. Findings from various studies have documented that for some cereal grains, the pesticide residues are mainly found in the outer covering hence processing such as milling and related processes can bring about reduction in the amount of the pesticide residues. Usually cereal crops are sprayed with insecticides before storage so that they can be preserved for more than one year without being attacked by pests.

### **Factors that favour the presence of pesticide residues in food :**

Various factors contribute to the higher amount of these residues in most developing countries. One is the wrong dosage and poor adherence to standards with respect to the application of these pesticides. Although some pesticides such as hexachlor-cyclohexane as well as Dichloro Diphehyl Trichloroethane (DDT) have been banned, most farmers still use them for agricultural activities and pest control.

Poisoning due to pesticide is a serious health issue at both national and global level. This is associated with

the various agro-allied and agricultural activities in different countries of the world, which has also put the users of these chemicals at risk. It has also been reported that exposure to pesticides at occupational level is more in Nigeria when compared to other countries in the world because of the low level of protection among the workers.

### **Toxicity due to pesticide residue in food :**

Various illnesses have been reported to be associated with the consumption of plants food substances that have pesticide residues beyond the MRLs with respect to the daily intake and acute reference dose (ARD). Based on this, a consumer is not considered to be at risk, when the dietary intake that is estimated is not beyond the ARD.

### **Pesticides: Their properties, uses and disadvantages :**

Agricultural pesticides are used to control organisms which diminish yield and quality of crops, or which damage food material during storage and shipment. The insecticides, fungicides and herbicides are the most widely employed, but numerous smaller groups such as the acaricides or mite killers, the nematocides or eel-worm killers, and rodenticides also exist. The present survey which will be presented in two parts; is limited to a general account of some of the more important or interesting toxic substances used in agriculture. In the first part, consideration will first be given to some general principles common to most types of pesticides; and these will then be applied to insecticides, acaricides and nematocides. The second part will deal principally with the more important of the fungicides and herbicides. Stress will be placed upon the physical, chemical and biochemical properties of toxic substances, for such characteristics determine not only the uses to which the materials can be put in the field but also the magnitude of residual effects in soil, food and fodder and the attendant risks to livestock and man. Vast use of pesticides is not only affecting the quality of soil, but also having harmful effects on the health of humans and animals. Though the use of pesticides can help farmers in increasing the productivity of the crop, but using pesticides at a higher level is not a sustainable form of agriculture. Using high quantities of pesticides causes an imbalance in the cycle of biotic and abiotic materials present in nature. This leads to environmental pollution and is harmful to human health.

**Impact of pesticides on water :**

A chemical that is toxic to one animal may also be toxic to other forms of life. Several pesticides are toxic to humans. Most of the pesticides are capable of creating harm to us in many ways. Many pesticides are found to be unsafe for water system. Caution should be used to ensure that these products do not unnecessarily enter the water system. These chemicals owe threat to water systems and mechanisms. They can contaminate surface waters and groundwater and if their concentrations are above critical thresholds, they can be harmful to the environment. The Water Framework Directive has set the environmental quality standards for pesticides in surface water. To assess the chemical status of groundwater, a precautionary quality standard of 0.1 µg/L is set for pesticides, reflecting the desire to keep pesticide concentrations in groundwater at low levels.

**Impact of pesticides on human health :**

Pesticides can cause short term adverse health effects, called acute effects, as well as chronic adverse effects that can occur months or years after exposure. Such examples include stinging eyes, rashes, blisters, blindness, nausea, dizziness, diarrhea and death. Chronic effects known to be caused by pesticides are cancers, birth defects, reproductive problems, immunotoxicity, neurological and developmental toxicity, and disruption of the endocrine system. Infants and young children are known to be more susceptible than adults to the toxic effects of pesticides. Farm workers and pesticide applicators are also more vulnerable because they receive greater exposures. Immediate health effects from pesticide exposure includes irritation of the nose, throat, and skin causing burning, stinging and itching as well as rashes and blisters. Nausea, dizziness and diarrhea are also common. Now a days it is matter of concern for the scientists and environmentalists of our country about how to diminish the ill effects of chemical fertilizers in agriculture.

**Impact of pesticides on plants health :**

Pesticides can be absorbed by plants through the leaves and roots. Pesticides that are taken up by plants can also move to other parts of the plant. After being taken up by the plant, they are often are designed to interfere with the plants development by mimicking plant hormones. Such herbicides can take longer to act, but they can also be more effective because they are working

throughout the plant. Other herbicides are meant to kill by contact. Systemic insecticides move throughout the plant. When insects feed on the plant, the insecticide can kill them. This type of insecticide can be harmful to bees and other pollinators. When the bee is pollinating the plant, it may also receive a toxic dose of the pesticide.

**Impact of pesticides on crop products :**

Some pesticides pose a potential risk to humans and other life forms and unwanted side effects to the environment. No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects. The world-wide deaths and chronic diseases due to pesticide poisoning have reached about 1 million per year in the year 1999. The high risk groups exposed to pesticides include production workers, formulators, sprayers, mixers, loaders and agricultural farm workers. During manufacture and formulation, the possibility of hazards may be higher because the processes involved are not risk free. In industrial settings, workers are at increased risk since they handle various toxic chemicals including pesticides, raw materials, toxic solvents and inert carriers. Pesticides can also contaminate the tissues of virtually every life form on the earth, the air, the lakes and the oceans, the fishes that live in them and the birds that feed on the fishes. Certain environmental chemicals, including pesticides are known to elicit their adverse effects on the crops and in long term, they have lot of harmful effects on humans and livestock that consume crops cultivated by using pesticides.

**Conclusion :**

Chemical pesticides of one form or another have become a dominant and essential form of pest control throughout the world since the 1940s. Thousands of different commercial pesticides are available in the market. According to a Green Peace Report, India is now producing 90,000 metric tons of pesticides as the largest industry in the whole of Asia and twelfth largest in the entire world. The pattern of pesticide use differs significantly between the countries. The usage of pesticides in India is only 0.5 kg per hectare. Most pesticides used in the agriculture and public health sectors are transferred to soil where their fate is determined not only by soil micro flora and micro fauna but also by the chemical environment of the soil. The ecological risk inherent to pesticides arises from the differential

vulnerability of different biotic communities to their toxic action and the differential response of organisms to their non-lethal but possible long-term effects. The benefits of pesticides include increased food production, increased profits for farmers and the prevention of diseases. Although pests consume or harm a large portion of agricultural crops, without the use of pesticides, it is likely that they would consume a higher percentage. There have also been many problems associated with their use. When pesticides are used, they do not always stay in the location where they are applied. They are mobile in the environment and often move through water, air and soil. Instead of using chemical pesticides, it is now essential that biopesticides be used in agriculture so that not only productivity is kept high, but harm caused to agricultural soil as well as human health is saved. Hence, it is necessary that the use of pesticides should be regulated and limited in a significant way along with increasing the usage of biopesticides so that it agricultural products stay beneficial to us and not cause any harm to the environment.

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