

## IMPACT OF FERTILIZERS ON HUMAN HEALTH AND ENVIRONMENT

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### Abstract

One of the biggest issues on the planet right now is pollution. To meet the demand for agricultural products and to feed the expanding population, farmers use a variety of chemical fertilisers to boost production and control weeds and insect pests. Overuse of synthetic pesticides and fertilisers has had a detrimental effect on both the environment and human health. The increasing destruction of environmental resources is therefore the biggest threat to humanity on the globe. The rapidly rising population in emerging countries intensified the mismatch between human wants and resource sustainability. Chemical fertilisers have increased agricultural output while causing severe environmental and health problems. Chemical fertilisers' phosphates and nitrates are the main contributors to water pollution.

**Keywords:** Chemical fertilizers, farmer, Environmental pollution, Human health.

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### Introduction

Chemical fertilisers have increased agricultural output, which has been a boon for farmers all over the world. Today, more than 300 million tons of various chemical poisons in the form of fertilisers and pesticides are produced under different brand names (Tomkins & Bird, 2002). Despite having a much lower average pesticide consumption than many other affluent nations, India has a serious pesticide residue problem (Abhilash and Singh, 2008). The negligent use and management of pesticides in agriculture has caused significant problems with human health in many developing countries during the past three decades (Dasgupta et al. 2007). The new market economy and globalisation have a significant impact on how fertilisers are used in agriculture. Fertilisers improve soil productivity to

produce better-quality agricultural output. The exponential rise in fertiliser use in recent years has had a negative impact on the environment. By increasing the production of food and other agricultural items through the use of high-yielding seed types, altering farm equipment, and greatly increasing the use of fertilisers, developing nations like India helped the Green Revolution put an end to continuous food scarcity.

Fertilisers can be made of natural or synthetic materials. In contrast to artificial or chemical fertilisers, natural fertilisers are organic in nature. Animal dung and other naturally occurring materials are used in organic fertilisers, whilst inorganic fertilisers are made of synthetic components. They typically have more nutrients. Fertilisers either restore the

chemical elements that previous crops removed from the soil or increase the land's inherent fertility. In order to create mixed fertilisers, separate substances can be chemically combined and used as a binding agent. Alternatively, straight fertilisers can be mechanically combined.

Manufacturing facilities for multiple products make up the fertiliser sector. Farmers now must use chemical pesticides and fertilisers to increase agricultural productivity to the highest possible levels in order to feed the world's population. However, using these fertilisers excessively has negative impacts on both population and environmental health. Infertility issues in soil are caused by excessive fertilisation, increased salinity, heavy metal buildup, and nitrate accumulation. Through the soil and its interactions with other organisms in the food chain, plants absorb chemical fertilisers. Use of excessive amounts of chemical fertilisers in the soil has the potential to contaminate groundwater and possibly the surface water of rivers and lakes. In order to produce enormous quantities of agricultural products, modern farming is based on a commercial approach in which farmers use a great deal of artificial fertilisers and pesticides. Both organic and inorganic fertilisers contain the chemical elements that aid in the growth and increased production of plants. The main components of non-organic fertilisers are potassium, ammonium, phosphate, and nitrate salts. Natural radionuclides like  $^{238}\text{U}$  and  $^{232}\text{Th}$  as well as heavy metals including Hg, Cd, As, Pb, Cu, Ni, and Cu are thought to be found in the fertiliser industry. When used as pesticides and fertilisers in agricultural farms, these chemical components have catastrophic effects on the environment and human health. The negative effects of these

synthetic chemicals on human health and the environment can only be diminished or eliminated by switching to new agricultural technological practises, such as abandoning chemical intensive agriculture and using organic inputs like manure, biofertilizers, biopesticides, slow-release fertiliser, and nanofertilizers, etc.

### **Environmental Pollution through Chemical Fertilizers**

Any substance that harms people or other living things is referred to as pollution. In order to supply the soil with the essential nutrients for plant growth, fertilisers are chemicals, either manufactured or natural. In the form of fertilisers and pesticides, a sizable amount of chemicals, primarily heavy metals including Hg, Cd, As, Pb, Cu, Ni, and Cu in the soil, are administered to agriculture every year (Atafar et al. 2010). Inappropriate use of these pesticides and fertilisers causes a variety of environmental problems, such as soil, water, and air pollution.

These pesticides are causing an increase in water contamination, and even in low quantities, they pose a serious threat to the ecosystem (Agrawal et al. 2010). Chemicals, especially nitrates found in chemical fertilisers, are the main culprits behind water poisoning. Irrigation practises have increased recently in India's semi-arid and dry regions, which has caused more nitrate to accumulate in the soil. Nitrate is the main ingredient in fertiliser and a key marker of water pollution. Nitrate is the most typical form of dissolved nitrogen in groundwater. Drinking water contains nitrate, which the gut absorbs and affects the excretory system.

In addition to nitrates, chemical fertilisers also include other elements including phosphates, arsenic, and chloride that contaminate water. There is a high

concentration of nitrogen and phosphorus compounds in the water as a result of the decline in water quality and an increase in pollution from the growth of aquatic plants and algae. Due to their interactions with atmospheric water, sulphur dioxide and nitrogen oxide pollutants also significantly contribute to pollution by causing acid rain. The ecosystem and creatures that are not the intended targets are seriously threatened by the pollution caused by chemical fertilisers.

#### **Chemical Fertilizers and human health**

In order to increase agricultural productivity, agrochemicals are seen as a potent weapon in developing nations (Bhandari, 2014). As a result of continued chemical fertiliser use, pests become resistant and more challenging to control. The artificial fertiliser ingredients nitrate and phosphate run off into nearby bodies of water or are released there, contributing to eutrophication. Higher levels of nitrates in drinking water induce blood disorders in people, which result in the production of abnormal amounts of methemoglobin that cannot adequately release oxygen from the body. Groundwater with high sodium nitrate concentrations has been linked to testicular and stomach cancer.

The harmful compounds in fertilisers are mixed together and absorbed by plants, where they cause major health problems by entering the food chain through vegetables, cereals, and water. Numerous pesticides induce neuron disorders, some have an impact on embryo development, and others are human cancer-causing, according to a study analysis of the last two decades about the exposure to chemical fertilisers and health of humans. Fertilisers have been found to include heavy metals like Mercury, Lead, Cadmium, and Uranium,

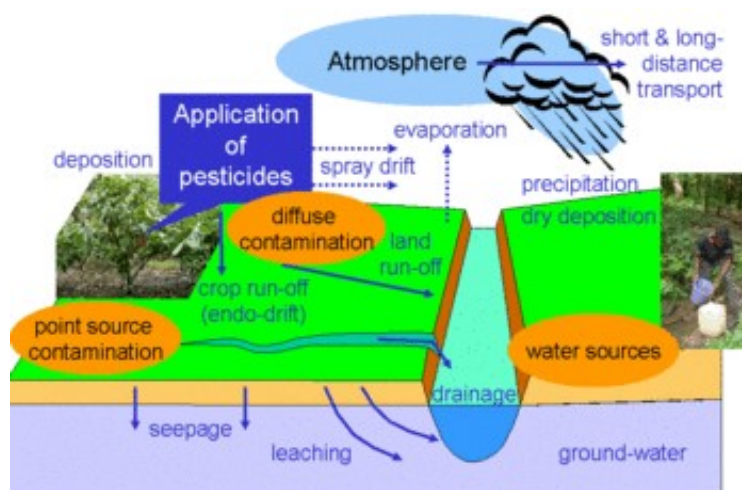
which can disrupt the kidneys, lungs, and liver and cause cancer (WHO, 1990). Chemical fertilisers used for an extended period of time also inhibit microbial activity and unbalance the pH of the soil. Some ingredients in the fertilizers are toxic to the dermal and respiratory system. Use of excessive quantity of chemical fertilizers damages the vegetation and reduces soil fertility.

Other health issues caused by ammonium nitrate include eye and skin irritation, which gives a burning feeling. It can cause irritation of the nose, throat, and lungs when inhaled, among other health issues. In addition to these, using it can cause headaches, anxiousness, nausea, vomiting, flushing of the face and neck, fainting, and collapse. Methaemoglobinemia, a disease that affects infants, is brought on by plants accumulating too much nitrogen. Amines produced from nitrogenous fertiliser are responsible for human cancer. Potassium chloride interferes with the function of nerve impulses and other bodily processes, mostly affecting the heart. It can result in nausea, vomiting, bloody diarrhoea, convulsions, headaches, mental impairments, and redness or itching of the eyelids, among other symptoms. Cadmium eventually makes its way into human tissues and causes conditions including trachea-bronchitis, pneumonitis, pulmonary edoema, renal failure, osteoporosis, and many more. High levels of aluminium cause birth abnormalities, asthma, alzheimers, and bone conditions. Developmental and neurological toxicity, growth retardation, cognitive impairment, kidney, nerve, and immune system damage are all consequences of calcium toxicity.

Only at high concentrations does cobalt cause lung injury. Boron impairs sperm production and irritates the eyes, nose, and

throat. The respiratory, reproductive, and gastro-intestinal systems are thought to be harmed by manganese. Lindane is a neurotoxin and can cause breast cancer. It is a known carcinogen that also has an impact on the reproductive system. Chloropyrifos can result in respiratory failure, pneumonia, muscle paralysis, and starvation in fetuses. If malathion enters the body, it can harm the nervous system. DDT is the cause of numerous cancer types, acute and chronic neurological system injuries, lung damage, injury to the reproductive organs, immunological and endocrine system

malfunction, and birth defects in humans (Thuy, 2015). DDT, a typical insecticide, has neurological side effects. Compared to women without breast cancer, those who had breast cancer had a six to nine times higher likelihood of having the pesticides DDT or hexa chlorobenzene in their bloodstreams. Breast cancer and exposure to chemical pesticides are strongly correlated. 2014 (K. Anitha et al.). Organophosphate pesticides used on vegetables slowly accumulate in people's bodies and have a connection to cancer (Miah et al. 2014).



**Fig 1. Environment Impact of Fertilizers**

## CONCLUSION

Today, there is a lot of concern about toxic agricultural chemical residues getting into human food. The use of fertilisers and technology in agriculture is crucial in the current global environment of a rapidly expanding economy to meet the demand for food from a population that is both growing quickly and becoming a significant source of income, but excessive use of chemical fertilisers in agriculture causes numerous environmental and health issues. Future conditions are under jeopardy due to environmental degradation brought on by pesticides (Sitaramaraju et al. 2014).

According to data collected over the past few decades about pesticide exposure and human health, chemical pesticides can have a wide range of harmful effects on human health, including effects on the skin, digestive system, nervous system, respiratory system, reproductive system, and endocrine system (Osman, 2011; Weisenburger, 1993; Mnif et al., 2011). This review's objectives are to identify environmental and health issues brought on by poor fertilisation practises and offer suggestions for how to address them.

Reviewing the literature has led researchers to the conclusion that using too much synthetic fertilisers is bad for people's health. It has a negative impact on human health either directly or indirectly by contaminating the air, soil, and surface water. Some diseases may be brought on by chemical fertiliser with high nitrate and nitrite concentrations. High radioactive concentrations and heavy metals like cadmium and chromium in some fertilisers can induce respiratory and excretory problems. Ingesting too much cadmium can cause cadmium poisoning, which can harm the kidneys, bones, and lungs (WHO, 1992). To achieve this, fertiliser management is crucial, and reducing or replacing the use of hazardous fertilisers requires planning. The present study carried out by opting organic farming will create a healthy natural environment and Human health for the present as well as future generation. Development means not only economic growth, but it should be sustainable, to solve such problems everyone should have the knowledge of environment and environmental ethics. Through opting organic farming, we can create a healthy natural environment and human health.

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