

Effects Of Pesticides On Environment And Human Health

Dr.Balraj Singh¹,Dr.AshutoshAwasthi², Mr. Devendra Pal Singh³

^{1,2,3} Department of Agriculture, TeerthankerMahaveer University, Moradabad, Uttar Pradesh, India

¹balrajsingh.agriculture@tmu.ac.in, ²ashutosh.agriculture@tmu.ac.in, ³devendra.agriculture@tmu.ac.in

Abstract

Chemical stress on natural environments has increased in agricultural industrial development. Pesticides are agrochemicals used for the protection in agricultural, ecological and industrial green spaces of plants and people from various pathogens. Furthermore, their recorded potential for producing a significant detrimental effect on security and the weather can be a serious factor of their side effects on environmental health dangers. There are many ground-breaking conceptual modifications in agriculture and in food processing, which have incorporated productive practise leading to food Sovereignty and are the compelling need for further effective and environmentally responsible solutions. It is clearer than ever that society wants to adopt a modern agricultural model for food production that is healthier for environments and human beings. It has become important to add industrial fertilizers and pesticides for optimal output of agricultural produce and to feed the increasing population. These types of farming practices have allowed food grain growth and sustainability but at the same time have a significant effect on the human health and environment. This paper offers a description of the public safety and environmental effects of agricultural pesticides and fertilizers.

Key words: Plants, Agro-chemicals, Environmental health, Food sovereignty, Pesticides, Guidelines

Introduction

Insecticides are chemicals or mixtures used primarily in plant or public healthcare services to protect plants against vector-borne diseases such as dengue, malaria and schistosomiasis, and rats, weeds and pathogens. Typical examples include fungicides, insecticides, herbicides, rodenticides and regulators for plant production. These goods are used for other uses as well, such as developing and preserving non-agricultural areas such as large sport fields and urban green areas. Additionally, there are many lesser-known uses of such chemical items, like in pet shampoos, construction products, and boat bottoms to remove or avoid the existence of undesirable organisms. Many of the pesticides were concerned with safety and environmental problems, and other pesticides were eliminated for agricultural use. Pesticide penetration may be by skin touch, inhalation or ingestion. Pesticide form, length and route of use, and human health condition (e.g. dietary deficiency and healthy / damaged skin) are variables that decide the potential outcome for safety[1].

Pesticides may be metabolised in animal or human body fat, emitted, stored, or bio accumulated. The potential adverse health effects of synthetic chemicals include, but are not limited to, dermatological, metabolic, psychological, cancer causing, heart, reproductive and endocrine effects. In addition, elevated rates of industrial, unintended, or deliberate exposure to pesticides may contribute to hospitalization and death. A large range of daily products, including, for information, baked products, beer, alcohol, soda products, fizzy drinks and livestock feed can contain pesticide residues[2]. In addition, washing & peeling cannot completely remove contaminants. In some cases, quantities may not exceed the law's reasonable restrictions. Moreover, these "fair limits" would ignore the actual health hazard as in the case of reciprocal exposure to two or more chemical compounds that occur under real-life conditions and may be synergistic. In samples of human breast milk chemical residues have also been detected and concerns have been raised about maternal poisoning and the health implications of babies.

The latest study aims to illustrate the pressing need for a modern farming paradigm requiring a dramatic decrease in the usage of industrial pesticides. Since the health impacts are broadly discussed in the current literature and associated to exposure to a particular groups of synthetic chemicals, including organophosphates, Pyrethroids, carbamate, triazine and organochlorine and neonicotinoids, the whole article examined primary

systemic impact of health effects and current health effects. Additional emphasis has been given to "glyphosate," a widespread herbicide, which would be a relatively uncompromising organophosphate chemical associated with modern farming.

Organochlorine Pesticide:

Dichloro-diphenyl-trichloro-ethane is the most commonly recognized organochlorine pesticide, i.e. the DDT insecticide, whose unchecked application posed numerous environmental and human health concerns. Any other organochlorines employed as pesticides include endosulfan, Dieldrin, heptachlor, methoxychloride and dicofol. A few nations either use DDT or intend to reintroduce it for purposes of public safety. In certain solvents DDT is often used as a remedy. It is an omnipresent toxic material, and any human entity on Earth is thought to have a body load of DDT, primarily contained in fat [3].

There exist a proof that DDT and its "dichlorodiphenyl-dichloro-ethylene" (DDE), metabolite p, p- could have potential for endocrine damage, as well as cancer action. In utero sensitivity to both DDE and DDT was correlated with effects on neuro-development in babies. In addition, DDE contributed to hepatic lipid dysfunction in rats in recent research. Health complications such as endocrine abnormalities, impacts on embryonic growth, lipid metabolism, and hepatic and haematological changes were correlated with general category of organochlorine pesticides. Their carcinogenic ability is being debated, but questions cannot be overlooked regarding future carcinogenic steps.

Organophosphorus Pesticides:

A wide range of chemicals, the most famous of which are glyphosate, is commercially available as a more environmentally secure option for organochlorine. This group also includes other chemicals known for their ability to disrupt, such as Malathion, Dimethoate, and Parathion. In this category, the impacts on the functioning of cholinesterase enzymes, decreased insulin production, normal cell protein disorder, fat metabolism and carbohydrates have already been recognised as well as genotoxic effects and effects on mitochondrial development which are responsible for the causing of cellular stress, endocrine and central nervous problems [4].

Populace research has found possible linkages between organophosphorus pesticide susceptibility and major health implications, involving coronary disorders, adverse reactions to male reproduction and nervous systems, diabetes, and likely elevated incidence of non-Hodgkin lymphoma as well. In fact, maternal susceptibility to organophosphates was associated with reduced gestational time and infants developing developmental disorders.

As far as the preservation of glyphosates is concerned, the most widely utilized herbicide in current agriculture, is the preservation of that is an issue of ongoing scientific debate, particularly after the advent of genetically modified glyphosate resistant crops like soya and corn. The pervasive use in soybean derived from genetically modified products has raised concerns about synergistic oestrogen effects due to the simultaneous exposure of the isoflavone soybean as well as soybean to glyphosate and 'genistein' phytoestrogen. Glyphosate may have endocrine disorder, affect human in vitro erythrocytes as well as encourage cancer in the mouse's skin [5].

In addition, a pathway believed to trigger significant disruption is shikimate, which is a pathway found in both bacteria and plants and mammalian bacteria in the gut. This disorder may affect people's supply of essential amino acids. Commercial glyphosate forms are more damaging than that of the active ingredient. Glyphosate-based herbicides such as the famous 'roundup' may cause DNA damage and serve as endocrine disruptors for rats and human tissue, lead to harm to human cells cultivated in the skin and promote cell death in animal testis cells in the lab.

A new research explored the potential association between pesticides, genetically engineered crops and declining health in the United States. Analyses of association posed questions over potential linkages regarding the usage of glyphosate and different health consequences and illnesses like asthma, diabetes, strokes, obesity, and renal impairment, disorders of Alzheimer and Parkinson, and cancer. Also there are concerns about the

potential for gluten-allergy induction of glyphosate; safety hazards associated with a lack of essential trace metals; fertility concerns; and an elevated chance of contracted lymphoma of non-Hodgkin.

Carbamate pesticides:

Another type of chemical pesticide linked with the activity of endocrine disrupting products, potential reproductive conditions, as well as impacts on mitochondria, including metabolic cell mechanistics are carbamate pesticides such as carbofuran, aldicarb and ziram. Additionally, genotoxic effects on ovarian hamster cells and necrosis as well as apoptosis in human, natural killing, immune cell as well as T-lymphocytes occur in vitro experiments. In fact, it was mentioned the transcription factor associated with the process of poisoning of dioxins, carbaryl, which refers to the families of carbamate pesticides, is a ligand also for hepatic aryl hydrocarbon receptor. There is also proof that carbamate pesticides are capable of inducing neurobehavioral symptoms, elevated likelihood of dementia, and lymphoma other than Hodgkin. Triazines, like simazine, atrazine, and ametryn, are another type of organic pesticides due to endocrine-disrupting consequences and risk for reproduction. In fact, a potential causal association occurs amid triazine herbicides and the occurrence of breast cancer. Atrazine is by far the most widespread herbicide used and also is associated to oxidative stress and cytotoxicity. Moreover, laboratory animal atracin sensitivity was associated to reproductive risk and sexually matured faults.

The effective insecticides presently potential for agricultural as well as public health use include synthetic pyrethroids, such as fenvalerate, permethrin as well as sumithrin. However, there are data on their potential for endocrine disrupting behavior, including reproductive behaviour, in animal models. In addition, several pyrethroid metabolites have been linked in a study conducted to DNA damage in sperm cells which raises concern about possible adverse impact on human reproductive health. It should also be noted that their potential for developmental neurotoxicity is concerned. The most widely used insecticides advertised for their minimal risk for non-target organisms, neonicotinoid pesticides, comprising thiacloprid, imidacloprid and guadipyre, are fairly new. There are, however, plenty of evidence to the contrary; its impact on bees shows this typically. The potential effects mostly on endocrine and reproductive systems of animals are also demonstrated. In addition, a new analysis demonstrated that neonicotinoids can boost enzyme aromatase production, that is used in breast cancer and often plays an important part in developmental cycles.

Effects of Pesticides and Fertilizers on Human health:

Researchers reviewed an analysis of agrochemicals and their impact on the atmosphere concluded that agrochemicals are used in developed countries as an effective tool or magic bullet to increase the efficiency of agriculture. This has been found, however, that agrochemicals pose significant hazards, and certain pesticides can influence the endocrine and immune systems of humans, which can encourage cancer growth. Farmers have been advised not to use health goggles, gloves and other defensive equipment during the spraying of pesticides, resulting in the bloodstream penetration to pesticides by inhalation and dermal contamination that may negatively impact their skin, eyes and respiratory system. The research demonstrates the association between the magnitude of the pesticide being used and the signs and symptoms of diseases induced by exposure among spray farmers who applied pesticides on their own and were thus directly exposed to pesticides[6].

The 17-month exposed spray farmers recorded high severe signs and symptoms such as burning / stinging of the eyes (17.42%), blurry vision (22.67%), heavy sweating / shortness of breath (33.1%), skin redness / itching (50%), nose burning (27.8%) and dry sore throat (20.05%). The signs and symptoms among the sprayers were found to be dependent on length. It is concluded that more information among the field sprayers and authorities is required to enforce and ensure the usage of protective gear when handling pesticides. When pesticides and fertilizers are used in agriculture, they are transmitted directly or indirectly into the corn and vegetables which affect human health. In fact, when pesticides are spread to crops that are inserted directly into human or animal bodies. Excessive usage of fertilizers can contaminate nitrate in the surface water, which is therefore harmful to humans. Concentrated water with nitrate will immobilize any of the haemoglobin in the blood. Organophosphate pesticides have risen in use, as they are both less effective and less damaging than organochlorine pesticides. But they are linked with severe health conditions such as stomach discomfort,

dizziness, fatigue, diarrhoea, vomiting, and complications with the eyes and skin. There have been several experiments aimed at determining the relationship between cancer-pesticides[7].

Organophosphate pesticides used in crops are slowly stored in the human body and have a cancer relation. Investigators have investigated the effects of shifting agriculture on public security and determined that disproportionate, indiscriminate use of harmful fertilizers and pesticides, allows continued air pollutants of the human food chain [8]. Soil and water pollution of toxic fertilizers and pesticides is an important issue

These freshwater pollutants normally come from restricted quantities and can therefore not be observed or smelled. Therefore, these negative effects have not been evident for several decades in humans, and have helped to spread dangerous diseases, such as severe kidney disorder. As far as food plants are concerned, the Green Revolution has brought India autonomous yet indiscriminate use of manufacturing pesticides and fertilizers poisons the climate and food. Punjab, a farmer country considered by the Indian republican as the cereal bowl of the nation, faces serious challenges. Nutrient deficiency in pollution of soil and surface water, residues of chemicals in bovine milk and grain and increasing cancer levels in farmers are few examples of Green Revolution.

The study shows that DDT was the most common and efficient pesticide to help citizens combat unwanted species and achieve drastic agricultural improvements. However, since there have been records of a variety of harmful consequences of this insecticide, usage of DDT has been banned worldwide. Given the extreme restrictions, DDT is still used illegally in many countries, especially in developing nations. Bad effects of DDT on public wellbeing have been generally recognised and disseminated to alert the community and discourage unintended events from occurring. Nevertheless, although DDT hasn't been used in recent years, owing to long residual effects and persistence across the food chain it still impacts human health[9].

In terms of human health, DDT is the source of cancer of several forms, acute and chronic nervous system injury, reproductive organ injury, lung damage, endocrine and immune dysfunction, and birth defects. During the mid-sixties, pesticide usage was implemented in India as part of green movement and malaria preventive programmes. While pesticides were valuable for insect control they were also blamed for threats to human health. Today such chemicals, especially those that accumulate in food chain, bring a variety of hazards to human safety[10].

It has been documented that pesticides trigger many adverse health effects that rely on the degree and length of the exposure. Pesticides' health symptoms vary from minor asthma, rashes, respiratory problems, neurotoxicity and developmental disturbances to serious chronic diseases such as cancer. Preventive approaches that involve the use of alternate sustainable farming methods or mitigation strategies that are focused on reducing the release of contaminants from food and water by various production processes will tackle this threat to food health[11].

Effects of Pesticides and Fertilizers on Environment:

Soil, a fundamental farming requirement, will be polluted through the removal of various toxic metals, industrial pollution, mining, metal waste disposal, diesel, fertiliser production, water slots, irrigation of the drainage system, chemical substances, waste from coal combustion, etc. In history, a large number of chemicals as pesticides and fertilizers have been introduced to farms every year. This activity can result in an increase in heavy metals, particularly in soil Arsenic, Cd and Lead. In agriculture, the usage of insecticides, pesticides, and other different chemicals is a very simple, fast and inexpensive approach for weed control and herb pest controls[12].

The usage of chemicals comes at a tremendous expense, however. Nearly any aspect of the world has been polluted and their traces are present in dirt, water, land and air. Researchers concluded that pesticides in urban landscapes are often seen as a quick, inexpensive and easy solution for controlling weeds and insect pests. Pesticides have had almost every component of the environment contaminated. Residues of pesticides are present in air and soil, and nationally in groundwater and surface, and usage of industrial pesticides contributes to the issue.

Contamination of pesticides presents major threats to the ecosystem and to non-target species from beneficial soil microorganisms to humans, plants, fish and birds. Contrary to common misunderstandings, even herbicides may trigger environmental damage. The research performed in the Sharda River system surface water in India records concentration rates and distribution trends of organochlorine pesticide residues in Solid Phase Extraction (SPE) was used to remove organochlorine pesticide residues from water samples. Dieldrin, hexa-chloro-cyclohexane isomers, heptachlor epoxy, and DDT were the most frequently found organochlorine pesticides in surface water[13].

Pesticides have contaminated nearly every aspect of the ecosystem, and traces of pesticides are present in soil, groundwater, air, and surface. Contamination by pesticides presents major threats to the ecosystem and to non-target species from beneficial soil microorganisms including flies, trees, fish and birds. Latest experiments have shown that pesticides continuously pollute our climate, and rates of biocidal pollution have risen tremendously. The depletion of the atmosphere owing to pesticides is jeopardizing the potential situation. However, limiting the usage of pesticides and fertilizers by adding them only at the right time as well as where suitable, must be considered for the spatiotemporal variations of all the soil as well as the crop factors of a given region. This changeability also encompasses variability in productivity, field, crop as well as soil but also some aspects like damage to the wind or floods. It may be beneficial for computational structures, such as geographic information structures, various sensors and global positioning systems.

Discussion

The emerging danger problem faced by pesticides has created issues for human safety and the climate. A solution to this devastation situation is the development of a stronger alternative to growing pesticide formulations. The pesticide threats may be handled to some degree if the pesticides are used in sufficient amounts and used only as needed when available, or if they opt for organic farming. As a consequence of these chemicals, water contamination is on the rise, although at small amounts, these chemicals face significant environmental danger[14].

Data on exposure to pesticides and human health over the past two decades showed that some pesticides cause neuronal dysfunction and degenerative disorders, several affect fetal development, some trigger congenital defects, while some are carcinogenic to humans. The indiscriminate usage and improper treatment of pesticides in cultivation has created severe public health issues in many developed countries during the past three decades[15].

A pesticide is typically a chemical, as in antimicrobial, virus, bacterium, or disinfectant that deters, disables, destroys, rodents, etc. By raising the crop production, pesticides have proven to be a blessing for both growers and citizens around the globe. Basically, the input of pesticides in agriculture is increasing following the announcement of the Green Revolution, which in turn helps the nation to tackle the major food crisis problem. Though pesticide implementation acts as a blessing it often has a long-term detrimental impact of damaging the ecosystem and human safety. Today, India is Asia's biggest pesticide manufacturer, and ranks eleventh in the world for pesticide use. While Indian average pesticide use is much lower as compared to the several other developing economies, the pesticide residue issue in India is alarmingly large[16].

Current agricultural activities include the extensive handling as well as consumption of substances reported for its capability to develop harmful health effects in humans as well as livestock, as well as to disrupt the entire environment. However, an immediate strategic solution is needed to that the usage of agrochemicals and put sustainable practices into operation. Moreover, conventional farming needs to adopt practices that are environmentally friendly and less dangerous for public health. Overhauling farming practices to meet these criteria is a move towards to the longevity of the agriculture industry rather than precision farming [17].

Conclusion

There is a need for plant control has also been granted and originates in ancient times when pesticides were used for chemical and organic compounds. Several toxic chemicals have since been created and international

agrochemical companies that control mainly the world's food supply, incorporate fresh pesticide-property chemicals and take on biotechnological growth., thereby diverging from conventional farming methods. In addition, existing farming activities are focused on the systematic usage of industrial pesticides that have had adverse effects on human safety, biodiversity and the ecosystem.

Present agriculture has to contend with essential issues such as population increase, food protection, industrial pesticide health threats, pesticide tolerance, natural environment destruction and climate change. Recent years have seen the introduction of several modern ideas surrounding agriculture and food development. A concept of climate-smart farming which seeks solutions in the current climate change context has proved to be beneficial. There is another big unresolved dispute between the proponents and Adversaries of GM-resistant crops not only regarding their health but also their impact on pesticide usage. This literature study would show growers not providing adequate safety precautions for the use of chemicals and therefore these growers misuse large amounts of pesticides, which causes many disorders of public health, causing pollution water and soil. Since such a large proportion of the population relies on farming for food, the pesticides are commonly used in the agricultural sector to improve productivity by protecting yields from possible danger. Adequate precautions need to be taken to protect human life and climate from the adverse impact of pesticides..

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