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Impacts of Pesticides and Chemical Fertilizers on Human Health and Environment

Shama. B. Lomate
[1]*(Department of Chemistry, Kaikadevi senior college shirur (ka.) Dist. Beed (MS)-413249India)*
Email:: shama.chemistry123@gmail.com

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Abstract:*In developing country like India, a marketable surplus of agriculture is the most important factor which influences the economic development of a country. To meet the demands of agriculture goods adequately and to feed the increasing population, the phenomenon of Green Revolution came into existence. Green Revolution, allowed developing countries like India to overcome continual food scarcity by producing more food and other agricultural products by using high-yielding varieties of seeds, modifying farm equipment, and substantially increasing use of chemical fertilizers. For an optimum production of agriculture produce and to feed the growing population, application of chemical fertilizers and pesticides has become necessary. Such type of agriculture practices allowed growth and sustainability of food grains but at the same time have the major impact on the environment and human health. This article provides a sketch of effects of chemical fertilizers and pesticides on human health and environment.*

Key Word*:Green revolution, chemical fertilizers, pesticides, environment, human health.*

Introduction

A goal of agriculture is to meet the present food need of the society with the surplus amount of availability for exporting and future purposes. For increasing agricultural production and productivity, use of chemical inputs such as pesticides has increased. Pesticides are chemical substances that are meant to kill pests. In general, a pesticide is a chemical or a biological agent such as a virus, bacterium, antimicrobial, or disinfectant that deters, incapacitates, kills, pests. It is commonly used to eliminate or control a variety of agricultural pests that can damage crops and livestock and reduce farm productivity. Pesticides have proved to be a boon for the farmers as well as people all around the world by increasing agricultural yield. Basically, the input of pesticides in Indian agriculture increases after the announcement of Green Revolution which in turn helps our country to fight the major problem of food crises. Although the application of pesticides serves as a boon but also had a long term negative effect of harming the environment and human health. Currently, India is the largest producer of pesticides in Asia and ranks twelfth in the world for the use of pesticides. Although Indian average consumption of pesticide is far lower than many other developed economies, the problem of pesticide residue is very high in India[1].

The current issue of hazard posed by pesticides to human health and the environment has raised concerns. Production of better alternative to reduce pesticide formulations is an answer to this destruction condition. If the pesticides are used in appropriate quantities and used only when required or necessary or opting for organic farming, then pesticide risks can be tackled to some extent.

Water pollution is on the rise due to these pesticides, even at low concentration, these pesticides have serious threat to the environment[2].

The data for the last two decades regarding pesticide exposure and human health revealed that several pesticides cause neuronal disorder and degenerative diseases, some effect fetal growth and cause congenital anomalies and

other are carcinogenic for human[3]. Over the past three decades, the indiscriminate use and improper handling of pesticides in agriculture have caused serious human health problems in many developing countries[4].

Material And Methods

Effects of Chemical Fertilizers and Pesticides on Human Health:

Agrochemicals and their effects on the environment in Nepal concluded that agrochemicals are considered as a powerful weapon or magic bullets in the developing countries in order to enhance the agriculture productivity. However, it has been observed that agrochemicals are causing serious hazards and certain pesticides may affect the human endocrine and immune systems and may promote the development of cancer[5].

If the credits of pesticides include enhanced economic potential in terms of increased production of food and fiber, and amelioration of vector-borne diseases, then their debits have resulted in serious health implications to man and his environment. There is now overwhelming evidence that some of these chemicals do pose a potential risk to humans and other life forms and unwanted side effects to the environment[6]. No segment of the population is completely protected against exposure to pesticides and the potentially serious health effects, though a disproportionate burden, is shouldered by the people of developing countries and by high-risk groups in each country[7]. The world-wide deaths and chronic diseases due to pesticide poisoning number about 1 million per year[8]. 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. OC compounds could pollute 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[9]. The US National Academy of Sciences stated that the DDT metabolite DDE causes eggshell thinning and that the bald eagle population in the United States declined primarily because of exposure to DDT and its metabolites[10]. Certain environmental chemicals, including pesticides termed as endocrine disruptors, are known to elicit their adverse effects by mimicking or antagonizing natural hormones in the body and it has been postulated that their long-term, low-dose exposure is increasingly linked to human health effects such as immune suppression, hormone disruption, diminished intelligence, reproductive abnormalities and cancer[11].

Effects of chemical fertilizers and pesticides on environment

Soil, the basic need of farming may happen to pollute by the accumulation of various heavy metals, through emissions by industries, mining process, disposal of high metal wastes, gasoline, application of fertilizers, sewage sludge, pesticides, wastewater irrigation, coal combustion residues, etc. Historically, a large amount of chemicals is annually applied at the agricultural soils as fertilizers and pesticides. Such applications may result in the increase level of heavy metals, particularly Cd, Pb, and as in the soil[12]. Usage of pesticides, insecticides and other various chemicals in agriculture is very easy, quick and inexpensive solution for controlling weeds and insect pests. However, use of chemicals comes with a significant cost. They have contaminated almost every part of our environment and their residues are found in soil, water, land and air.

Pesticide sprays can directly hit non-target vegetation, or can drift or volatilize from the treated area and contaminate air, soil, and non-target plants. Some pesticide drift occurs during every application, even from ground equipment[13]. Drift can account for a loss of 2 to 25% of the chemical being applied, which can spread over a distance of a few yards to several hundred miles. As much as 80–90% of an applied pesticide can be volatilized within a few days of application[14]**.** Despite the fact that only limited research has been done on the topic, studies consistently find pesticide residues in air. According to the USGS, pesticides have been detected in the atmosphere in all sampled areas of the USA[15]. Nearly every pesticide investigated has been detected in rain, air, fog, or snow across the nation at different times of the year[16].

Pesticides have contaminated almost every part of our environment and pesticide residues are found in soil, air and in surface and groundwater. Pesticide contamination poses significant risks to the environment and non-target organisms ranging from beneficial soil microorganisms to insects, plants, fish, and birds. Recent studies have indicated that our environment is chronically polluted by pesticides and levels of biocide contamination have increased tremendously. The environmental deterioration due to pesticides is endangering the situation of future[17].

Kumar *et al.* (2013) concluded that pesticides are often considered a quick, easy and inexpensive solution for controlling weeds and insect pests in urban landscapes. Pesticides have contaminated almost every component of our environment. Pesticide residues are found in soil and air, and in surface and ground water across the nation, and urban pesticide uses contribute to the problem. Pesticide contamination poses significant risks to the environment and non-target organisms ranging from beneficial soil microorganisms, to insects, plants, fish, and birds. Contrary to common misconceptions, even herbicides can cause harm to the environment[18].

I. Conclusion

By reviewing the literature, it can be concluded that the farmers do not follow appropriate safety precautions with regard to pesticide application, large amounts of pesticides are inappropriately used by these farmers, leading to several human health disease, polluting our air, land, water. Since about major proportion of the population relies on agriculture for subsistence, the pesticides are used very widely in agricultural field to increase the production by protecting the yields from potential threat. To safeguard human life and environment from the toxic effects of pesticides, adequate steps need to be taken. Now it is a well-established fact that there is the foremost need to step forward towards our mother earth by nurturing it by going for the organic farming system. An answer to this havoc is the organic farming, an environmentally friendly agricultural approach which ultimately leads to proper human health. Moving back to our ancestor's course by performing organic agriculture is a step towards sustainability. Organic agriculture is a holistic production and management system which is supportive of the environment, health and sustainability[19]. Though the Government of India has been making concerted efforts to encourage farmers and people regarding organic produce and product, but it has not resulted in bridging the gap between the demand and supply of organic product in the market. So, working upon niche area of organic farming is yet to be explored and flourish.

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