

A Study of the Pesticides Benefits and Effects: A Review

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ABSTRACT: Agro - based pesticides are pesticides used by farmers to prevent the efficiency of pests in agricultural crop growth and productivity. It is important to protect farmers from pests, disease, weed and increased productivity per hectare, helping them grow more food on fewer land. This paper discuss about the pesticides along with its benefits and hazards. The usually utilized gatherings of pesticides are bug sprays, fungicides, fumigants and rodenticides. Pesticides act as a modifier that fills in as obliterating bug. A few pesticides are creature explicit and have explicit approaches to killing bugs. Pesticides therefore play an important role in the worldwide reduction of diseases and increase crop production. Therefore, it is essential to talk about the process of agricultural development; the historical views, the types and specific applications of pesticides, and the behavior, their contamination and their adverse environmental effects. Excessive pesticide use can lead to biodiversity destruction. So several birds, sea animals and animals are at risk for their survival by harmful pesticides. It is beneficial in future as by using these pesticides farmers can increase their production as well income and grow more food in less area.

KEYWORDS: Agriculture, Environment, Farmer, Food Quality, Insecticide, Pesticides.

1. INTRODUCTION

Pesticides are employed by humans to protect their crops and increase the quality of their food. A insecticide is a poisonous Chemical compound, or combination of substances or biotic agent are introduced in-to the atmosphere in order to obviate, regulate and, eliminating population of insect, weed, rodents, Fungi or additional harmful pest. Pesticides are used to attract, seduce and then destroy or mitigate pesticides. Their use is not limited to agricultural areas; they are also used in houses to govern cockroach, mosquito, rat, fleas, tick, as well as another pests in the form of spray, poison, and powder. Pesticides are frequently found in our food as a result of this, in adding to their presence in the air. These chemical fertilizers are applied to soils to compensate for mineral deficiencies and to supply additional chemicals needed for the optimum development of high yielding varieties. The pattern of plant development is greatly changed through the farming operations and research on plant tissue culture with the use of plant growth regulators. The major destruction of agricultural crops is by insects. Diverse forms of plant diseases are caused by fungus and bacteria. The yearly loss in agriculture by insect pests and plant diseases is estimated to be up to 30 percent [1] [2].

If only 50% of the loss can be spared from pests, our country's food crisis can be largely remedied. A pest may be described as any creature that causes financial loss or damage to human people' physical well-being. It might harm our crops, lead to illnesses in them or in people, etc. Some chemicals can destroy or kill these pests. There are several. Pesticides are generally accepted to play a major role in agricultural development because they can reduce losses of agriculture and improve affordable production and food quality. The urgent need to improve food production and control diseases transmitted by insects. In plaguicides, a poisonous compound material or mixing of a substance or natural specialist is purposely delivered in the climate to kill, forestall, stop, control and obliterate bugs, weeds, rodents, growths or other unsafe pesticides in cultivating, homegrown or modern conditions or to relieve bug populaces. Pesticide fills in as controller or modifiers that work by obliterating the bug (Figure 1). In rural field the bug spray are utilized to build the creation of value through controlling bug and bug related illness.

The over and abuse of pesticide has priority to huge medical issue, monetary misfortune and different natural issue. The resultant medical issue of pesticide incorporates disease, birth deformity, conceptive issue, liver, kidney, and brain issue and so on. The primary gatherings of usually utilized pesticides are bug spray, fungicides, fumigants, and rodenticides. The utilization of pesticides in the fields of ranger service, general wellbeing, the home area and, obviously, farming enjoy brought amazing benefits [3].



Figure 1: Illustrate the To apply insecticide to his rice paddy area, the farmer utilises a backpack sprayer[3].

2. LITERATURE REVIEW

Sachin K et al. Discussed pesticide usage and environmental impacts in agricultural and livestock animals. Fast, accessible and cost-effective solutions for weeds and insect pests in urban environments are generally regarded to be pesticides. Nearly every component of our environment has been polluted by pesticides. The soil and air of pesticide residues and the usage of urban pesticides all across the nation are detected in the surface and grounds. The pollution of pesticides poses major dangers for the environment and to non-target creatures, from beneficial micro-organisms of the soil to insects, plants, fish and birds. Unlike widespread misunderstandings, even herbicides may damage the ecosystem. In this paper author explained all the facts related to the impact of pesticides[4].

MW Akta explained the effect of pesticide which are utilize in farming along their benefits and hazards. Pesticide play an vital role in agriculture to control the insect, improving the food quality, increase the food production, etc. Along with benefits it's also having impact on environment and human health. In this paper Author discussed about all circumstance related to pesticides[5].

Niva Dutta et al. discussed The health and environment impact of pesticides. The health and environmental effect of pesticides is highly damaging, thus it is important to properly manage their usage. This is done by the providing the proper training about the uses of pesticides. The innumerous use of pesticides also kills the helpful microorganism as a result soil fertility of the soil is reduced. This paper also explained the Altered class of pesticide as well as its health influence[6].

V Kumar explained about the uses of Pesticide in agriculture as well as environment: Effects on humans fitness. Weeds and invasions of insects in agricultural areas and various pests and disease transporting agents are commonly used in households, work places, shopping malls and on highways. Pesticides It has several benefits and might lead to damage to biodiversity by using pesticides over[7].

3. DISCUSSION

3.1.Types Of Pesticides:

3.1.1 Fungicides:

Fungicides, also known as antimycotics, are poisonous elements that are uses to kills or limit fungal development. Fungicides are pesticides that kill or prevent fungus and their spores from growing. They can be used to control fungi, such as rust, mildews and blights, which cause plant damage. They might also be used in other locations to keep mould and mildew away. Fungicides function in a number of ways, but the majority of them harm fungal cell membranes or prevent fungal cells from producing energy, *cyproconazole*, *tebuconazole*, *triadimefon*, *Bordeaux combination*, *copper-oxychloride*, *tricyclazole*, and other antibiotics are examples.

3.1.2 Herbicides:

It is a chemical substance used to destroy or prevent the development of undesired plant like weeds in housing or farming areas, as well as invasive species. Herbicides used to clear waste ground are nonselective, meaning they destroy any plant material that comes into contact with them. Chemical herbicides provide a number of advantages above machine-driven weed control, including simplicity of applications, which can save money on labour. Although most herbicides are generally safe to animals and people, they can kill nontarget plants and the insects that rely on them, especially when used aerially.

3.1.3 Nematicides:

People use the chemical Nematicide to kill plant parasitic nematodes. Broad-spectrum toxicants with high volatility or other qualities that promote soil movement have been the most common. To eliminate the nematodes that affect the yield of tobacco in agriculture. Meloidegyne nematode infects the roots of tobacco plants and reduces the output greatly. As biological control agent, *Purpureocillium lilacinum* infests meloidegyne incognita. A strain of *P.lilacinum* has been found to generate proteases and chitinase, which can disintegrate the shell of nematode egg in order to enhance a narrow infection ties by the use of nematophgi. Also available are chloropicrin, ethylene dibromide, methyl bromide. The sterilisation of soil steam or the soil steaming method is utilised in heat treatment for disinfecting nematode/pathogen soils.

3.1.4 Insecticides:

The pesticides are chemicals used to kill, damage, repel or mitigate one and more insect species, and are usually called pesticides. There are several methods in which insecticides operate. Some perturb the insects' nervous system, while others damage, repel or govern their exoskeletons in another manner. They can be packed in many shapes, including sprays, polishes, gels and apples. Due to these characteristics, every pesticide might represent a distinct danger to non-target insects, persons, animals and the environment. They are likely to significantly change the components of the environment and are both human- and 'animal' hazardous. Some pesticides are concentrated in the food chain. The drawbacks of insecticides are: It can kill more than targeted human-risk organisms. They also affect aquatic creatures when they combine with water sources through leaching, drifting, or run-off[8].

3.1.5 DDT:

DDT is a pesticide commonly used to control insects (diphenyl-dichloroethane). It also served to control insects in agriculture, animals, institutions, residences and gardens. DDT is no longer effective in eliminating mosquitoes due to the development of adaptive resistance.

3.1.6 Carbamates:

Carbamates are carbonic acid derivatives with a – OCON = group in the molecule. *Carbofuran*, *Propoxur*, as well as *Aldicarb* are three carbamate that are routinely utilized (*Temik*). *Herbicide (phenyl carbamates, thiocarbamates) and fungicides (Di thiocarbamates)* are likewise carbamate derivatives. Carbamates are effective against nematodes and snails. Carbamates have a unique mechanism of action[9].

3.2.The Benefits of Pesticides:

The primary and secondary advantages indicated in Table 1 are two different. The primordial advantages are recognised as the side consequence of immediate, less obvious or longer-term impacts of main benefits, such as the protection of human, animal and agricultural health and the protection of recreational turf[10].

Table 1: Illustrate Complexity of pesticide effects, main and secondary advantages[10].

Primary benefits	Secondary benefits
1. Controlling pests and plant disease vectors:	Community benefits:
Improved crop/livestock quality Reduced fuel use for weeding Reduced soil disturbance Invasive species controlled	Nutrition and health improved Food safety/security Life expectancy increased Reduced maintenance costs
2. Controlling disease vectors and nuisance organisms:	National benefits:
Human lives saved Human disturbance reduced Animal suffering reduced Increased livestock quality	National agricultural economy Increased export revenues Reduced soil erosion/moisture loss
3. Prevent or control of organisms that harm other human activities and structures:	Global benefits:
Tree/bush/leaf hazards prevented Recreational turf protected Wooden structures protected	Tree/bush/leaf hazards prevented Recreational turf protected Wooden structures protected



Pesticides have also the lots of benefit which are follows:

3.2.1. Increase the production:

Intricacy of pesticide impacts, primary and optional benefits. Pesticides can help crop yield by 20% to 50 percent. It likewise permits ranchers to benefit from extra significant cultivating device like great seeds, manures, and water. Pesticides are hence a key device for the feasible creation of great food and strands. Pesticides expanded benefits for ranchers and the avoidance of illnesses, by assisting the rancher with setting aside cash and work costs. Utilizing pesticides lessens how much time expected to eliminate weeds and bugs from fields physically[11].

3.2.2. Pesticides helps keep food affordable:

With the help of pesticides, it allows farmers to grow more food on the same piece of land. Organic vegetable growers spend substantially more time hand weeding than herbicide growers, according to studies. This helps to explain why organic food is more expensive than food farmed normally. This explains why organic food is costlier than food that is typically grown.

3.2.3. Pesticides helps conserve the environment:

They permitted ranchers to develop more yields per unit region, while requiring less work, lessens deforestation, saves normal assets, and forestalls soil disintegration. Pesticides likewise oversee intrusive species and risky plants. With the help of these pesticides, farmers may grow more food in less space, eliminating the need for broad areas to enhance food production and, as a result, eliminating the need for deforestation. It is advantageous to our environment.

3.2.4 Hardness of hand weakening has been eliminated by herbicides:

This implies that agricultural family all throughout the world can seek education and possibilities outside of farming. As a result, we can conclude that pesticides improve human life quality and living levels.

3.2.4. Securing the food storage:

Insecticides used in stored items can extend the lifespan of the food, preserve massive post-harvest loss due to pests as well as illnesses, and keep grains safe to eat. Farmers can keep their food for a long period with the help of insecticides.

3.2.5. Used in transport, sport complex, building:

Insect killer are widely used in the transportation industry, which mostly uses herbicide. Herbicide and insecticide are use to keep the turfs on sports fields, cricket-ground, golf-course, and several others sporting events in good shape. Insecticides are used to protect commercial and government buildings, as well as others wood structure, from termites as well as other wood-boring insects.

3.2.6. Vector disease control:

The most efficient way to combat vector-borne diseases is to destroy the vectors. Insecticides are often the only viable means of controlling insects that spread diseases like malaria and typhoid. Other vectors may play a role in specific regions, depending on the frequency of the vector and disease prior to the disaster, as well as the population's vulnerability. On the other hand, some of the most serious disease vectors are hardly considered a nuisance in many areas as their bites are almost painless such as Anopheles mosquitoes the vectors of malaria[12].

3.3. Hazards Of Pesticides:

3.3.1. Effect of pesticide on health:

The basic nature, haphazard application or abuse of pesticide are very vulnerable to hazardous pesticide effects human beings (Table 2). Ingestion, inhalation, penetration (skin), although most individuals get harmed by the intake of pesticide tainted food, enters the human body. The pesticide has acute and chronic effects, including acute effects on the skin, headache, pruritus, diarrhoea, stomach discomfort, nausea, vomiting, blindness, etc. which are shown in Figure 2[5].

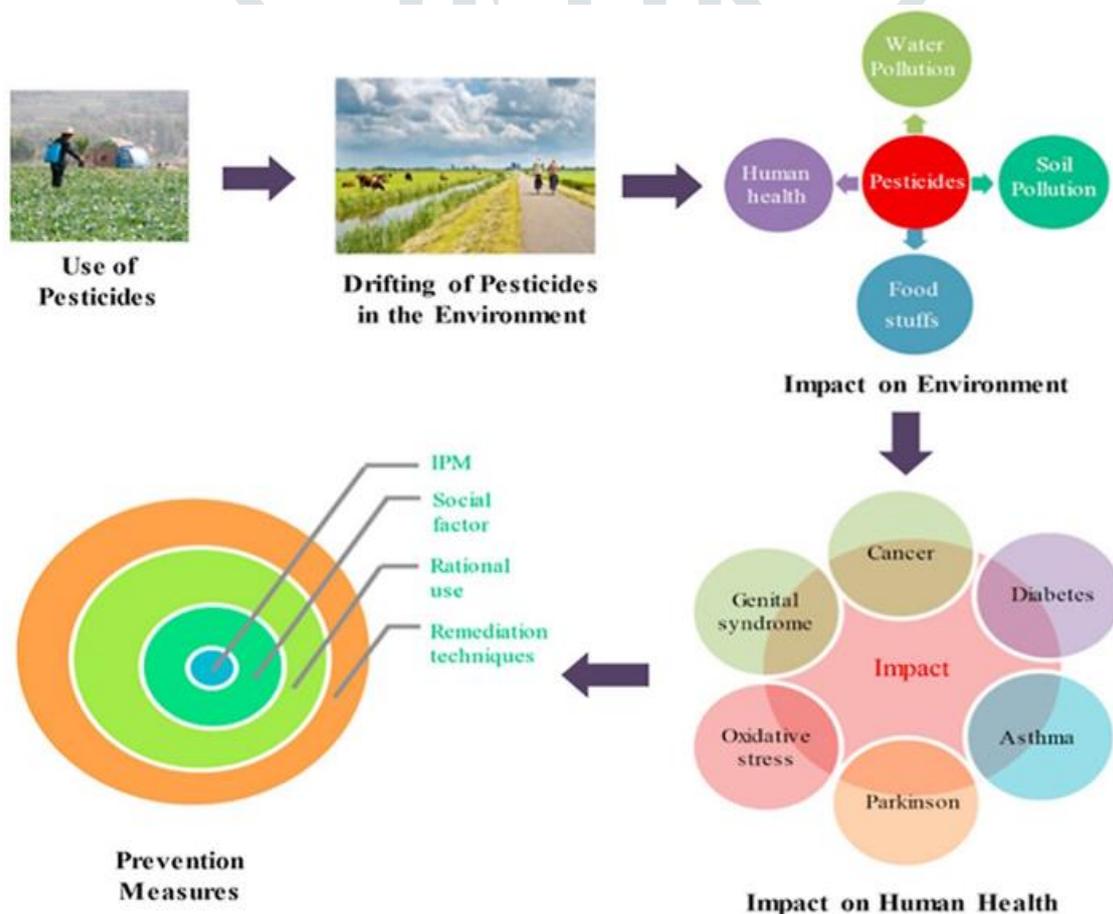


Figure 2: Illustrate the Complete Process of the Pesticides Which Impact on Human Health[5].

3.3.2. Long term consequence of pesticide injury body organ and diseases as follows:

- Neurological-Pesticide cause neurological wellbeing impacts incorporate memory or learning handicap, vision, weakness, flagging inability and so on.
- Safe Immune impacts incorporate touchiness, asthma, and hypersensitive response.
- Cancer-causing Pesticide related with mind disease, prostate malignant growth, ovarian disease and so on. It is assessed that overall compound openness is liable for 4% of all demise from disease.

- Endocrine disruptors- Pesticide acts as an endocrine disruptor as it's blocking/imitation, display and hormones in the live organism interfere with the endocrine system. Especially estrogenic effects that influence the reproductive system such as still birth, abortion and other types of miscarriages have been confirmed shown in Table 2[13].

Table 2: The below table displayed various classes of pesticides and its impact in human health and along with their treatment[13].

Pesticides	Exposition	Sign and symptom	Treatment
Carbamates	Lungs, gastrointestinal tract and skin	Miosis, salivation, sweating, tearing, behavioral change	Maintenance of vital function and cholinesterase levels. Avoid the use of parasympathomimetic agents.
Organochlorin	Lungs, gastrointestinal tract and skin	Dizziness, headache, nausea, vomiting, diarrhea, muscle weakness, mental confusion, anxiety	Maintenance of vital function and administer diazepam and Phenobarbital to control seizures.
Organophosphorus	Skin, conjunctiva, gastrointestinal tract, and lungs	Muscarinic syndrome and nicotine syndrome, resulting of excess acetylcholine in the synaptic cleft	Maintenance of vital function and cholinesterase levels. Avoid the use of parasympathomimetic agents.
Pyrethrin and pyrethroids	Lungs, gastrointestinal tract and skin	In coordination prostration, drooling irregular movement of limbs and hypersensitivity to stimuli	Decontamination of the skin and eyes, besides basic maintenance of vital functions.

3.4. Effect Of Pesticide over an Environment:

The majority of the ranchers and field laborers are ignorant and they applied pesticides without screening and legitimate explicit data, because of which different shaky impact presented on climate. Because of sporadic screening at times they utilized pesticide abundantly subsequent to harming the yield. At last those are enduring for long time in the climate and causes natural contamination uniquely soil contamination. The innumerable utilization of pesticides likewise kills the supportive microorganism because of which the self-ripeness property of soil is decreased. As to it is vital to have useful comprehension of their physical and compound properties, since their solvency decide the transportation of surface overflow and retaining limit of soil. In a few cases bug are protections from a specific pesticide as impact of normal choice, which prompt risks to non-target creature and cause abrupt demise of that life form. The lengthy timespan enduring pesticide makes risks biodiversity of oceanic or earthly creature (Figure 3). Pesticides are placed to oceanic environment that go about as harmful specialist and makes risk amphibian plant and creature. Soil, water, turf, and different vegetations might be debased by pesticides. A wide range of animal types, including birds, fish, supportive bugs and non-target plants, may kill bugs or weeds as well as goal harmfulness to pesticides. As a rule, bug sprays are the most profoundly toxic group of pesticides, albeit likewise non-target species could confront a risk [10].

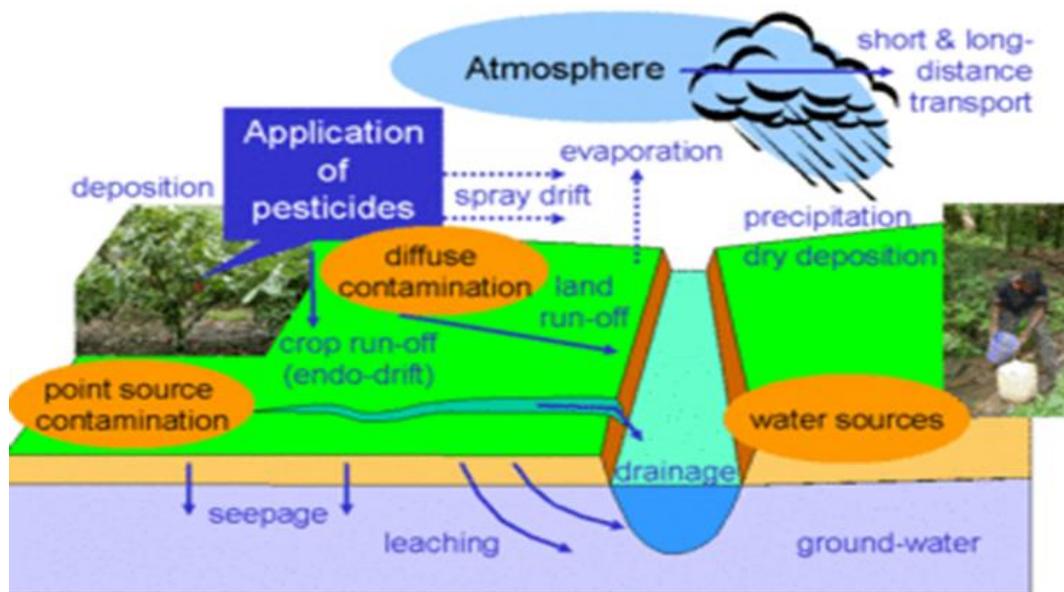


Figure 3. The above figure shows the environmental impact of pesticides which are harmful for crop and human beings[10].

3.4.1 The following are the main alternatives to conventional chemical insecticides shown in Table 3:

Table 3: The main alternatives to conventional chemical insecticides

S NO.	Alternatives of pesticides
1	Natural pesticides.
2	Biological pest control.
3	Plant genetic engineering.
4	Interfering with insect breeding.
5	Application of composted yard waste.
6	Cultivation practices.
7	Release of organisms that fight the pests.

These methods are increasingly used and are regarded as safer than traditional chemical insecticides. Cultivation, crops cultivated in areas where harmful plagues don't dwell and pests removed from the real crop employing trap plants are all instances of agricultural methods. Examples of these creatures include natural predators or parasites of pests[9].

4. CONCLUSION

From the above study about the pesticides, there is no any kind of doubt, the pesticides having lots of benefits such as, improve the crop productivity in agricultural land (with in less land), and it help the quick development to plant, It is very helpful for controlling the insect which affect the crop production. This improves economics and fulfils needs, but the gloomy aspect can also influence abiotic and biotic aspects since pesticide exposure is greater. The value of soil is reduced, it's also affect the purity of water due to which it is dangerous for aquatic animals and human beings and, pesticides having the environmental impactFor both plants and humans, some pesticides are mutagenic and carcinogenic. Through research that can serve better the environment and that is of importance to all humans, environmentally friendly pesticides (organic and inorganic) must be changed. A number of fields, including public health and agricultural operations, have had wonderful advantages from utilising pesticides. Pesticides in public health are used to kill pests in homes, workplaces, mall and street, including mosquitoes, ticks, rats and mouse Inadequate usage of pesticides contribute to environmental damage, including contamination of soil, water pollution, air

pollution and food. Climate change also causes pesticides. As a result of climate change, the amount and diversity of pesticides might potentially increase. Climate change impacts crop development, climatic circumstances, insect pest migration and dispersion, changes in pest copiousness, the quantity of pests and vector spread, weeds evolution and disease stimulation. The management of pesticide pollution and its adverse effect on non-target species and environment is therefore required. In order to better understand the use and management of pesticides in future, these studies should include focus on occupational and environmental exposures and on the associated pesticide health risk assessment. In order to avoid pesticide contamination Bio pesticides (Organic) should also be developed together with chemical pesticides. Because organic insecticides have less environmental and human health impacts.

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