

## MOVEMENT OF CROP PROTECTION CHEMICALS IN DIFFERENT ENVIRONMENTAL COMPONENTS

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### **Abstract**

The chemical industry has a significant role to play in the development of agricultural crop-protection chemicals. Many crops would be seriously harmed if they weren't there. Insecticides, for example, are critical in the fight against both human and animal diseases. Over the past six decades, the environmental and toxicological qualities of these compounds have greatly improved. A researcher's goal is to develop chemicals that are not only potent, but that are also particular to the intended use and do not harm the environment in any other manner. There is a constant need for new products to be created to combat pests that may become resistant to crop protection treatments.

**Keyword:** Crop, Crop Protection, Pesticides, Industrialization, Chemicals, Environmental Components.

### **Introduction**

The Indian economy relies heavily on agriculture, which employs almost half of the country's workers and contributes around ~ 17% of GDP. As a result of the early 1970s Green Revolution, production and productivity increased significantly. The Green Revolution transformed India's economy from one of food scarcity to one of abundance. Exports of agricultural products have increased as a result, but it has also helped meet the needs of India's enormous population. [1]

Agricultural industrialisation has led to an increase in the chemical burden on natural ecosystems. Pesticides are agrochemicals used to protect plants and people against a variety of diseases on agricultural land, in public health programmes, and in urban green spaces. Environmental health risk variables can be a major concern because of their proven ability to create several harmful health and environmental consequences. Food sovereignty and sustainable agricultural reforms are only two examples of new ideas developed out of the pressing need for a more environmentally friendly approach to our daily food production. [2] We can no longer deny the pressing need for a more humane and environmentally friendly agricultural model for food production.

Pesticides include insecticides, fungicides, herbicides, rodenticides, molluscicides, nematicides, plant growth regulators, and others. After the 1960s, many of the most technologically advanced countries restricted or prohibited the use of organochlorine (OC) insecticides, which had been shown effective in combating diseases like malaria and typhus. [3] Organophosphate (OP) insecticides, carbamates, pyrethroids, and other synthetics were introduced in the 1960s and 1970s, while herbicides, fungicides, and other synthetics were introduced in the 1970s and 1980s. In an ideal world, a pesticide would be fatal to the pests it is intended to control, but not to other species, including humans.

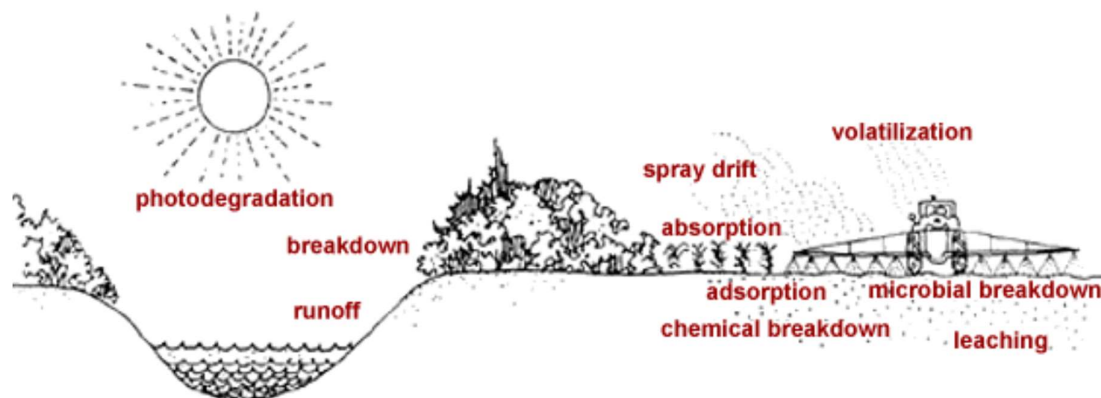
### **Benefits of pesticides**

It is beneficial to use pesticides to keep hazardous pests, illnesses and invasive plants out of crops and the natural environment, among other advantages of pesticide use. Environmental consequences can arise from the application of pesticides as well, especially when they spread outside of the intended area.

Pesticides' fate in the environment is influenced by a slew of factors. Adsorption, transport, breakdown, and degradation are all examples of these processes. A pesticide is said to be transferred if it is moved

away from its intended target. Volatilization, spray drift, runoff, leaching, absorption, and crop removal are all examples.

The next sections go over each of these steps in detail.



The primary advantages of pesticide use are the immediate results of their effects – the anticipated benefits. Killing caterpillars that eat on the crop, for example, has the major consequence of increasing yields and improving the quality of cabbage. Among the 26 primary benefits of the three main consequences are the safeguarding of recreational turf and the averting of human deaths. There are additional benefits to the major benefits that are less evident or immediate. [4] They may be subtler, less visible, or longer-term in nature. As a result, secondary advantages are more difficult to link to pesticide use, although they might still be compelling arguments for doing so. It is possible that increased cash generated by a larger cabbage yield might be used to fund children's education or healthcare, resulting in an overall healthier and more educated population.

A number of issues confront the Indian crop protection business. Listed below are a few of the most pressing issues to be resolved:

- The rising expense of product development and the resulting delay in bringing new items to market are both the result of more stringent laws around the world.
- Incapability to invest in R&D by Indian manufacturers: As R&D expenditures continue to rise, Indian companies are forced to focus on generic products.
- Educating farmers: It is critical to teach farmers how and when to apply insecticides and the correct dosage and frequency in which to do so.
- The lack of an efficient distribution system makes it difficult for agrochemical companies to promote their products and educate farmers about their use and benefits.
- In the pharmaceutical companies, novel molecules can take almost 10 years while generics can take up to five years to be approved.

### Review of Literature

Apples and blueberries in the US diet were examined by Lewis et al. (2005) [5], who came to the conclusion that their high levels of antioxidants protect against cancer and heart disease. Wild blueberry production doubled and consumption increased as a result of increased herbicide use, according to Lewis. Pesticides pollute groundwater all throughout the world. A total of 143 distinct pesticides and 21 transformation products have been discovered in ground water, including pesticides from every major chemical class. There have been detections in the groundwater of more than 43 states over the last two decades. According to Waskom (1994), [6]

Pesticide use can reduce populations of soil microorganisms that are essential to the health of the soil. "If

we lose both bacteria and fungi, then the soil declines," says soil expert Dr. Elaine Ingham. As with antibiotic misuse in humans, chemical fertilisers and pesticides have negative consequences on soil organisms. Overuse of pesticides may work for a few years, but there aren't enough beneficial soil organisms to keep nutrients from leeching out" (Savonen, 1997)[7].

### Objectives

- To investigate the financial toll pests exact
- In-depth analysis of the global crop protection chemicals market
- Inquiry into crop protection chemical sales across the world
- To examine the market for crop protection chemicals.

### Research Methodology

It is the systematic, theoretical investigation of the procedures used in a given field of research. Methodology Theoretical analysis of a branch of knowledge's methodologies and principles is included. Paradigm, theoretical model and phases as well as quantitative or qualitative methodologies are familiarity information included. It is necessary to do extensive research into secondary sources in order to use analytical and descriptive methods. Secondary materials must be analysed closely in order to expand the textual analysis, which required attentive study of a few secondary materials.

### Result and Discussion

The cereals market has grown rapidly in recent years due to the increased use of crop protection agents in grain production. In 2021, the FAO predicts a 2% to 3% increase in worldwide cereal production over the previous year. [8]



crop protection chemicals market shown in Fig. 1

It has been subsidised by governments in poor nations to increase agricultural productivity by using crop protection chemicals. Grain and cereals are expected to be the most appealing market area as governments increase their focus on providing at least minimum access to healthy nutrition. [9]

This area of the chemical industry is dominated by three different types of compounds (Fig 2).

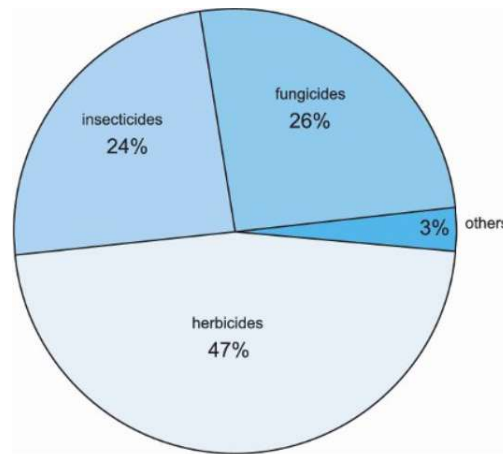
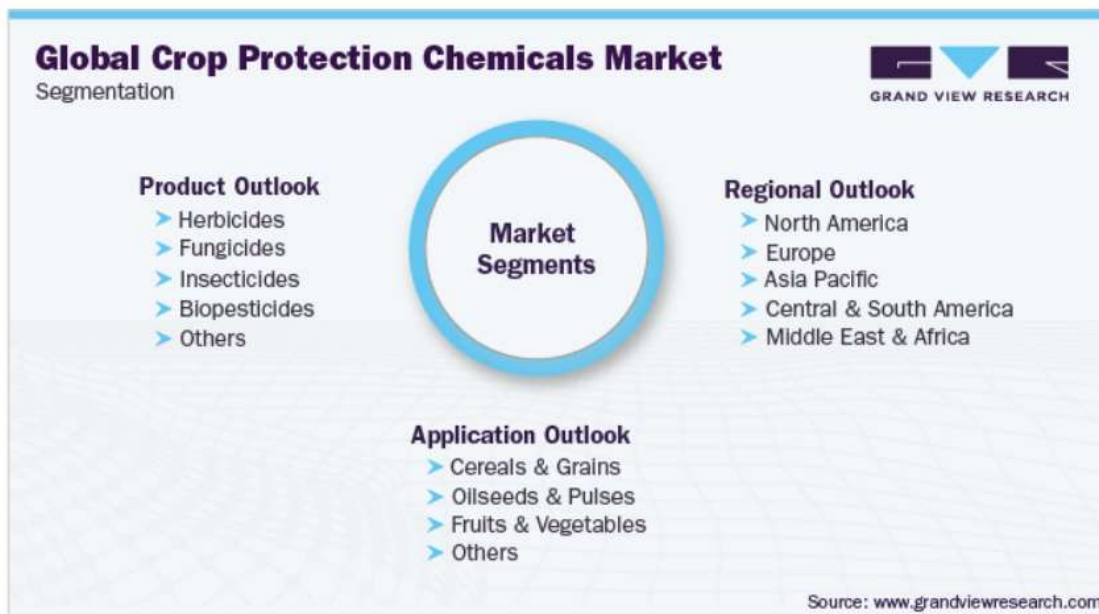


Figure 2: Sales of crop protection agents around the world.

They're out there. To control undesired plants (weeds), herbicides are used, as well as insecticides and fungicides to kill or hinder the growth of arthropod pests, such as insects and mites. Pesticides, all three of them. [10]

From 2016 to 2027, this study analyses the latest trends in the market in each of the sub-segments and projects volume and revenue growth on a global, regional, and country level. [11]



A description of global crop protection chemicals market segmentation is shown in Fig. 3.

The global crop protection chemicals market report has been categorised by product, application, and geography for this study by Grand View Research. [12-13]

There are currently 7 billion people on the planet, and this number is expected to climb to 9.3 billion by the year 2050. This will necessitate a 70 percent rise in global food production over the same period of time. [14]

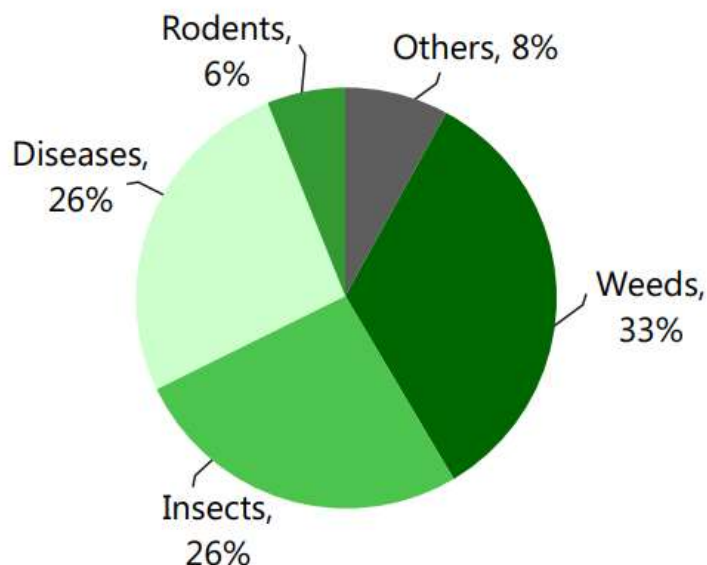


Figure 4: Losses as a result of different pests

The globe is today confronted with issues of food shortages, rising malnutrition, and rising food inflation. More food must be grown to fulfil future demand in order for this to happen. To make matters worse, pests, weeds, and diseases eat off 25% to 40% of global agricultural production (Fig 4) [15]

### Conclusion

Using pesticides to eliminate weeds and insects in urban settings is viewed as an easy, quick, and cheap alternative. Herbicides, on the other hand, have a high price to pay. Pesticides have infiltrated nearly every aspect of our natural environments. Dangerous pesticide residue can be found across countries' land surfaces as well as groundwater. Urban pesticide use is a significant contributor to this issue. Insects, plants, fish, and birds are all at risk if herbicides are polluted, as are the environment and non-target organisms.

### References

1. Thurman EM, Cromwell AE. Atmospheric transport, deposition and fate of triazine herbicides and their metabolites in pristine areas at Isle Royale National Park. *Environ Sci Technology*. 2000;34:3079–3085
2. Senthilkumar K, Kannan K, Subramanian A, Tanabe S. Accumulation of Organochlorine Pesticides and Polychlorinated Biphenyls in Sediments, Aquatic Organisms, Birds, Bird Eggs and Bat Collected from South India. *Environ Sci Pollut Res*. 2000;7:1–13.
3. Sardar D, Kole RK. Metabolism of Chlorpyrifos in relation to its effect on the availability of some plant nutrients in soil. *Chemosphere*. 2005;61:1273–1280.
4. Ross G. Risks and benefits of DDT. *The Lancet*. 2005;366(9499):1771.
5. Lewis NM, Jamie R. Blueberries in the American Diet. *Nutrition Today*. 2005;40(2):92
6. Waskom R. Best management practices for private well protection. 1994. Colorado State Univ. Cooperative Extension (August). <http://hermes.ecn.purdue.edu:8001/cgi/convertwq?7488>.
7. Savonen C. Soil microorganisms object of new OSU service. *Good Fruit Grower*. 1997. <http://www.goodfruit.com/archive/1995/6other.html>.
8. Porwal MK. Relative Economics of Weed Management Systems in Winter Sweet Potato (*Ipomoea batatas* L.) in Command Area of Southern Rajasthan. *Indian J Weed Science*. 2002;34:88.

9. Oerke EC, Dehne HW. Safeguarding Production – Losses in Major Crops and the Role of Crop Protection. *Crop Protection*. 2004;23:275.`
10. B. B. Buchanan, W. Gruissem and R. L. Jones (eds.): “Biochemistry and Molecular Biology of Plants,” American Society of Plant Physiologists, 2000.
11. Agbioinvestor: The Crop Protection Industry Report (2017).
12. P. McDougall: AgriService, Industry Overview—2016 Market (2017).
13. Popp, Jozsef & Hantos, Krisztina, 2011. "The impact of crop protection on agricultural production," *Studies in Agricultural Economics*, Research Institute for Agricultural Economics, vol. 113(1), pages 1-22, March.
14. Surfactants in plant disease management: A brief review and case studies 2021, *Plant Pathology*
15. Pesticide exposure, safety issues, and risk assessment indicators 2011, *International Journal of Environmental Research and Public Health* Influence of amino acids in the hydroponic medium on the growth of tomato plants 2006, *Journal of Plant Nutrition*