Effects of Pesticides on Environment (Mahmood et al. 2016)

Overview.

A pesticide is a toxic chemical substance or a mixture of substances or biological agents that are intentionally released into the environment in order to avert, deter, control and/or kill and destroy populations of insects, weeds, rodents, fungi or other harmful pests. Pesticides work by attracting, seducing and then destroying or mitigating the pests. Pests can be broadly defined as "the plants or animals that jeopardize our food, health and/or comfort."

The use of pesticides has increased many folds over the past few decades. According to an estimate, about 5.2 billion pounds of pesticides are used worldwide per year. The use of pesticides for pest mitigation has become a common practice all around the world. Their use is not only restricted to agricultural fields, but they are also employed in homes in the form of sprays, poisons and powders for controlling mosquitoes, rats, fleas, ticks and other harmful bugs. Due to this reason, pesticides are frequently found in our food commodities in addition to their presence in the air.

Benefits. Pesticides provide primary as well as secondary benefits. The former ones are obvious after direct usage of pesticides such as the killing of insects that feed on crops. Later are the result of the primary benefits and they are for longer periods. Worldwide, 40 % of the agricultural produce is lost due to plant diseases, weeds and pests collectively. If there would have been no pesticides, crop losses would have been many folds greater. Moreover, these crop saving substances not only protect the crops from damage rendered by pests, but they also increase the yields of crops considerably (Benefits of Pesticides and Crop Protection Chemicals n.d.). In their study, Webster et al. 1999) indicated that there is a significant increase in crop production due to pesticide usage and stated that economic losses without pesticide use would be much more significant.

Risks. Risks associated with pesticide use have surpassed their beneficial effects. Pesticides have drastic effects on non-target species and affect animal and plant biodiversity, aquatic as well as terrestrial food webs and ecosystems. According to Majewski and Capel (1995), about 80–90 % of the applied pesticides can volatilize within a few days of application (Majewski and Capel 1995). It is quite common and likely to take place while using sprayers. The volatilized pesticides evaporate into the air and subsequently may cause harm to non-target organism. A very good

example of this is the use of herbicides, which volatilize off the treated plants and the vapors are sufficient to cause severe damage to other plants (Straathoff 1986). Uncontrolled use of pesticides has resulted in reduction of several terrestrial and aquatic animal and plant species. They have also threatened the survival of some rare species such as the bald eagle, peregrine falcon and osprey (Helfrich et al. 2009). Additionally, air, water and soil bodies have also being contaminated with these chemicals to toxic levels. Among all the categories of pesticides, insecticides are considered the most toxic whereas fungicides and herbicides are second and third on the toxicity list. Pesticides enter the natural ecosystems by two different means depending upon their solubility. Water soluble pesticides get dissolve in water and enter ground water, streams, rivers and lakes hence causing harm to untargeted species. On the other hand, fat-soluble pesticides enter the bodies of animals by a process known as "bioamplification." They get absorbed in the fatty tissues of animals hence resulting in persistence of pesticide in food chains for extended periods of time.

(1) (PDF) Effects of Pesticides on Environment. Available from: https://www.researchgate.net/publication/286042190_Effects_of_Pesticides_on_Environment [accessed Feb 05 2019].