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STATUS OF PESTICIDES PRODUCTION, CONSUMPTION AND GOVERNMENT POLICIES IN INDIA

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Abstract

Pesticideproduction and consumption have boosted the Indian agricultural sector. Pesticide consumption has been reflected in aggravated food production (from 252.02 million tonnes in 2015 to 296.65 million tonnes in 2020). The increase in application with lack of knowledge, training, and attitude towards protection of the environment, and one'sself leads to decline in the number of farmers working on the agricultural fields.Farmer'scluelessness about the harmful impacts of pesticides had led to their slow death. The governmental policies such as The Insecticide Act, 1968, The Insecticides Rules, 1971; and The Pesticides Management Bill, 2020 are there to support pesticide management and enhance the current situation but the bridge between farmer's and governmental policies are standing on weak pillars. There is a need to enhance the strength of these pillars and make the policy effectively reach the unskilled laborers and agricultural workers. This paper presents the impact of pesticides on farmer's lifestyles and policies of a government that would help to improve the situation.

Keywords: *Pesticide, Farmer's suicide, Governmental Policy.*

Introduction

A country grows or declines continuously in terms of population, technology, economy, management, and food requirements. These changes are not static and highly dependent upon human behavior. According to the 2011 census report, India's population is 1,210,854,977 (One billion twenty-one crores eight lakhs fifty-four thousand and nine hundred seventy-seven). A huge section of this number resides in rural areas (Census of India, 2011). All the economical and technological growth will be of no use if it cannot provide for its citizens. India ranked 101 in Global Hunger Index 2020 out of 116 countries. In such cases, the most valuable sector, i.e., agriculture and farmers,experience a lot of pressure to increase the production capacity. The agricultural sector has certainly enhanced the economical status of India amongst the world's other countries and is perceived to do so in the future also, stated in the report of the Economic Survey of India (Indian Agricultural and Allied Industries Report, 2021). Over the past few years, the production of food grains has been increasing invariably. Even in the situation of a pandemic, agriculture is the only sector that grew in India. The key factor that governs agricultural production is farmers who are most underrated character in this country. The next generation of farmers are not ready to walk in their parent's footstep, neither their parents want them to do so because in the house of a farmer monthly expenditure is more than revenue (The India Forum, 2019). Thus, the agriculture sector hits the skid. Not only income, but technical know-how is also a major problem because of which present farmers are dying and agriculture sector is moving towards the bottom. Lack of technical know-how induces incorrect application of pesticide (Stallons, 2006), pesticide exposure (London et al. 2005; Parron et al. 1996; Freire & Koifman, 2013)), improper crop management, indebtedness, and crash crops (Merriott, 2016). In the majority of cases, oral consumption of pesticides (Raddi & Anikethana, 2014), lack of governmental policies for regulation of pesticides, and negligence of existing legislature, and policies also draw our attention towards the deteriorated lifestyle of farmers (Ojo, 2016). This article aims to analyze the impact of pesticides application in farmer's life and to explore the related governmentpolicies that could improve the existing situation.

Pesticides, their production and consumption

Pesticides are applied on crops for their protection from crop-destroying pests, weeds, fungus, rodents, insects, etc. (Yadav &Dutta, 2019). These pesticides are classified into various types depending upon the target organismssuch as insecticides (Gupta, et al. 2019), fungicides (Gupta, 2018), herbicides (Powels& Yu, 2010), and rodenticides (Murphy, 2018; Jacob & Buckle, 2018), etc. Amongst these, insecticides account for the largest consumption (51%) followed by fungicides and bactericides (33%). Herbicides account for only 16% of consumption (Nayak & Solanki, 2021). Pesticide consumption in India is reported to be 0.6 kg/hawhich is much lower when compared with the world's average consumption that is 3kg/ha (According to chemical nature, pesticides are classified into organochlorines, organophosphates, carbamates, pyrethroids, phenylamides, etc. (Jayaraj, et al. 2016). Among the Indian states, Andhra Pradesh ranked 1 in pesticide consumption with the consumption amount of 6500 tonnes (Devi, et al. 2017).Pesticides, fertilizers, and other agrochemicals have played crucial roles in increasing the crop yield of major food that is consumed on daily basis. However, the effects soon became detrimental.Pesticides production in India has been given in figure 1.Yadav and Dutta (2019) reported that out of 275 registered pesticides in India, 255 are poisonous and more than 115 are extremely hazardous.

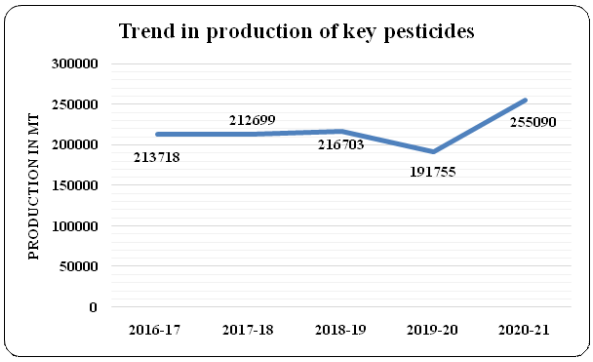

Figure 1. Production of key pesticides for the financial year 2016-17 to 2020-21 (Source. http://ppqs.gov.in/statistical-database)

Bonvoisin et al. (2020) described that until 2019, India registered 318 pesticides out of which 204 pesticides are reported under various hazardous categories of WHO. Nayak and Solanki (2021) reported that 293 pesticides are registered in India. 104 pesticides which are banned in other countries are still being used or produced in India. Fungicides account for more than 80 % of oncogenic risk (Gupta, 2018).

Impacts of pesticide application on farmers

Agricultural farmers could expose to pesticides via dermal contact, oral ingestion, and nasal inhalation and can further lead to both acute and chronic effects. Most of the time, insecticides are acutely toxic whereas herbicides show chronic effects. Exposure to pesticides can cause psychiatric disorders such as depression and anxiety which can be linked to suicidal actions (Freire & Koifman, 2013). The constituents of pesticides have the capability to disrupt the reproductive system of target organisms (Ojo, 2016). They have the tendency to inhibit acetylcholinesterase (Figure.2) and disrupt the endocrine system. The target pests have now developed resistance to these pesticides. As a result of which, agricultural workers are forced to use them in more quantity which affects the health of farmers and their pockets. One of the most important factors that playa key role in exposure to pesticides is personal protective equipment (PPE). Governmental policies made it mandatory for farmers to wear PPE kits such as masks, gloves, and overcoats while working with pesticides. However, farmers working intropical conditions where the temperature in the summer rises over 50?C find it difficult to wear such kits.

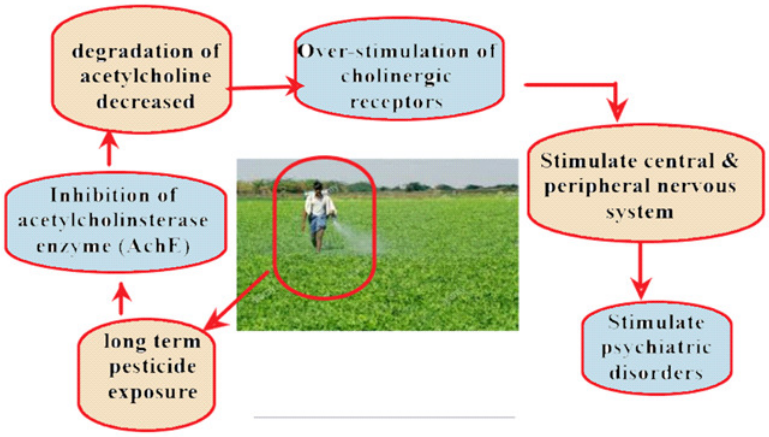

Figure 2. Schematic representation of how pesticides induce emotional disorders in agricultural workers.

Direct and Indirect Impacts

The pesticides affect the livelihood of agricultural workers in two ways-directly and indirectly. Direct effects are health impacts that are caused because of direct exposure to pesticides. Indirect effects are more complex to understand. It becomes so deadly, that farmers are forced to give their lives in frustration and disappointment. High-interest loan that supports pesticide application and crop management which further destroy a farmer's house. Ojo (2016) mentioned some unnecessary applications of pesticides, for instance, dumping of used pesticides in rivers, spraying of banned pesticides, and blending two different classes of pesticides (insecticides and fungicides). These applications lead to environmental and health impacts. Paucity in storage and inaccurate protective measures also lead to health and environmental hazards (Sucheta & Dutta, 2019). Disposal of used pesticide containers is another major problem that needs the attention of policymakers.

Pesticide and farmer's suicide

Pesticides are also consumed intentionally as a most effective way for conducting suicide which is common among farmers. In India, equivalent to 16000

farmers are reported to die each year due to suicide (Merriott, 2017) (figure. 3). Availability of such dangerous compounds in the local market should attract the attention of leaders and policymakers. 90.3% of pesticides suicides were reported from Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Telangana, and West Bengal (Bonvoisin, et al. 2020). Most of these states are agrarian states. Pesticide poisoning is most prevalent in agricultural laborers and unskilled workers particularly in male age group of 21-30 years (Raddi & Anikethana, 2014).

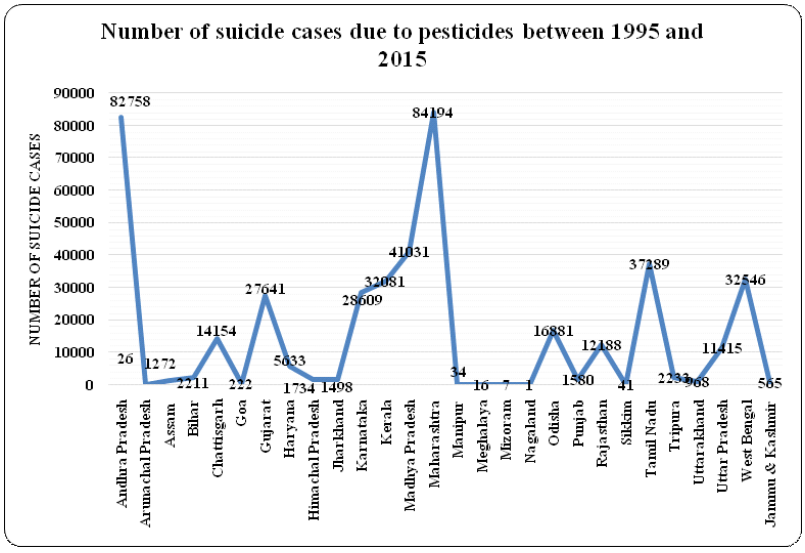

Figure 3. Distribution of suicide cases in different states between 1995 to 2015. (Source. Bonvoisin, et al. 2020).

Governmental Policies

The government of India has promulgated several policies for the safe handling of pesticides in agricultural and other sectors. All the policies that the government formed are included in the Insecticides Act, 1968; the Insecticides Rules, 1971, and The Pesticide Management Bill, 2020. These rules and acts are briefly mentioned below.

The Insecticides Act, 1968

The Insecticides Act, 1968 came into force on 1st March 1971. This act is promulgated to regulate the import, manufacture, sale, transport, distribution, and use of insecticides. This rule also envisaged preventing human beings and animals from safe handling of pesticides. Central Insecticides Board was constituted under this act whose main function is to make the central and state government aware of the risks associated with pesticides. CIB also has to protect the vulnerable population affected by pesticide use. A Registration Committee was formulated under this act whose role is to scrutinize the insecticides and register them accordingly (The Insecticide Act, 1968).

The Insecticides Rules, 1971

The insecticide rules, 1971 came into force on 30th October 1971. This rule envisages the various functions of the board, registration committee, and laboratory. It established some major rules under this section, for instance,therule for mixing coloring matter with insecticides, precautions against pesticide poisoning, determining efficiency and toxic levels of insecticides, segregation of expired and non-expired pesticides, manufacture of pesticides, and license duration, etc. It also contains rules for insecticides analysts and insecticide inspectors. The rule of 1971 has provisions for protective equipment, clothing, and other facilities for manufacturers. Rules for disposal of used packages, surplus materials, and washings of insecticides were also mentioned in this document (The Insecticide Rules, 1971).

The Pesticide Management Bill, 2020

This bill was made to regulate, manufacture, transport, storage, use, and disposal of pesticides for their safe and effective management and protection of the environment and human beings. The Pesticides Management Act, 2020 was formulated under this bill. This act constituted the Central Pesticides Board whose function is same as the Central Insecticides Board. The Registration Committee was constituted for registration of pesticides. A Central Pesticides Laboratory

was established under this act for analytical monitoring of pesticides (The Pesticide Management Bill, 2020).

Concluding Remarks

The detrimental impact of pesticides in the human being is not at all surprising as their prime nature is to kill unwanted living organisms. It affects mostly those who directly apply them to crops. The consumption of these pesticides is still increasing. However, the production trend is stable in the past few years. The policies pertaining to xenobiotic compounds can be considered rather slack and bent more towards the profit of manufacturers than the health of receivers. The present situation is evolving and trying to improve the slack in existing policies in terms of scientific legislation. Maharashtra state reported the highest number of farmers' suicide due to pesticides; therefore, our prime need is to start speculating the condition from the peak location. After Maharashtra, Andhra Pradesh is worst affected. While boosting the policies, one needs to understand that both the sides of see-saw need to exert equal effort in terms to reach a balanced point. Thence, people working in the agricultural fields ought to improve their behavior towards managing pesticides and sustaining the economy. As a researcher, our work should be to make aware them of every possible situation that could lead to adverse impacts and to make their work easier than by finding possible ways to treat their problems.

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