

## Continuing Issues in the Use of Pesticides for Procuring Life in Developing Countries

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**Abstract** – The basis for pesticide use in agriculture is that costs related with pesticide pollution are to be reasonable by its benefits, but this is not so apparent. Regarding the benefits by simple economic analysis has improved pesticide use in agriculture and thus produced pesticide persuaded public harms. This paper effort to explore the research gaps of the economic and social concerns of pesticide use in developing countries, predominantly with an example of India. We contend that although the negative sides of agricultural development. We assume that, if these difficulties are grasped and accounted for, the remunerations from the current use of pesticides could be remunerated by the costs of pollution and ill human health. This paper also explains different pathways and mechanisms for disregarding. In view of prospective and overall negative impacts of pesticide use, we recommend alternate ways of controlling pests such as unrestricted unified pest management along with education and training activities.

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### 1. INTRODUCTION

Pesticide use in agriculture offers yield benefits. Also pesticide use is likely to raise risks to human health, the natural environment, and social capital. The profits of pesticide use in agricultural crop production are often estimated by the yield increase gained versus the cost of buying inputs like seed, fertilizers, pesticide, and labor. But genuine valuations must take broader social and environmental influences into account. First, pesticide use may reduce people's well-being and, because of sickness, result in loss of yield, wages, and an increase in medical expenses. Second, deprivation of the environment or ecosystems also ultimately raises costs. There could be substantial costs of, for example, bioaccumulation, bio intensification, pest resistance and resurgence, mishandling of toxic chemicals and its effects for contamination of ground water, among others. This paper tries to explore the research gaps of the fiscal and social significances of pesticide use in developing countries, mainly with an example of India.

We hypothesize that, if these difficulties are recognized and accounted for, the benefits from the contemporary use of pesticides could be compensated by the costs of pollution and ill human health. We argue that traditional economics “generalized the complex world” in valuing benefits of pesticide use, which increased pesticide use and thus pesticide-induced public troubles, and marginalized third world subsistence farmers.

### 2. INTRICACY OF PESTICIDE USE

The Brundtland Report has already addressed the prominence of economic development without humiliating the environment and ecological reliability. But the use of certain pesticides may damage both environment and ecology and has major allegations for our common future. Then why are toxic chemical pesticides still in use despite its social and environmental impacts? It is highly doubtful that we can find a simple answer due to the related nature and intricacy of agricultural change. Valuing benefits of

insecticide use through simple economic analysis may raise pesticide use in crop production. The economic study weighs the predictable costs and benefits of pesticide use and claims that pesticide use is valuable. It maintains that pesticide use has reformed food production and the benefits of production far outweigh negative externalities caused to human beings and the environment. This position claims that the technologies embody the positive values to the human society, with population growth, hunger, deficiency, and starvation providing the basis for the dispute.

Pesticide use cannot be viewed out of perspective, but rather should be addressed from a complete system perspective. Several studies argue that insecticide use produces overall low economic returns if social and ecosystem health impacts are accounted for. As deliberated earlier, the estimates of benefits are, first, predictable and confined; second, do not take into account environmental influences like pollution of natural resources and ecosystems disturbances. It does not admit long term low dose recurrent exposures to pesticides and its connections to hormone interruption, reduced intelligence, reproductive aberrations, and cancer. In addition, clearance of outdated insecticides is likewise a major health threat; and possible linkages among pesticide use, international transport, and arctic ruin are emerging issues. Third, public health effects and social consequences (like suicide stabs by consuming pesticides, unintended poisoning by polluted foods, etc.) of pesticides are also not sufficiently considered. Moreover, the estimate does not arrest the physical and psychological pain and distress experienced as a result of critical and long-term illnesses. Furthermore, the causes of hunger and starvation in developing countries can, in fact, be elucidated by an interface of many biophysical, political, economic, and social factors and forces that are moderately external to these countries. A recent and straightforward example is the ambitious Millennium Development Goals that have been prepared almost exclusively by advanced nations and thrust upon developing countries without sufficiently addressing their interests, capacity, and viability of the goals. This efficiently amounts to goals set for the poor, uprights set by the rich.

We recommend perceiving the pesticide problem through an interdisciplinary perspective. Interdisciplinary is an approach to studying a specific complex problem at different levels with specific theories/methods, and tries to find the best possible solution to the problem. For example, growth of, or overview of concepts like IPM, Integrated Crop Management, Integrated Plant Nutrient Management System, etc. have, to some extent tried to diminish their respective problems by addressing both a communal and biological approach. These concepts are envisioned

to recognize optimum levels of insecticide usage with respect to human society as a whole. Because of the intricate nature of pesticides impacts, a simple benefit cost analysis is an inadequate measure of pesticide efficiency. Interdisciplinary complete systems analyses, taking a multitude of interrelating factors into account, while assessing the costs of pesticide use, are needed. We believe that crediting values for a multitude of interacting impacts (for example, human health, environmental and ecosystems, etc.) is difficult and much more subject to disagreement as the true costs of these impacts may not be computable in a single monetary unit. However, different methods established in a wide range of corrective sciences are rarely grouped for estimating the costs of pesticide pollution. Here, we are not only suggesting a group of people working together and to just adding different ideas from different disciplines, but rather we are proposing to a compromise through developing a well-defined theoretical perspective on cost effectiveness analysis by mutual proficient respects and creative tension. Otherwise, the estimates for complex problems are always underrated. Despite the enduring vestibule for interdisciplinary to study any complex phenomenon; the development within the academic world has advanced in the opposite direction, which might have enhanced adverse health and ecological concerns relegating existence farmers, especially in developing countries.

### **2.1 Insecticide Use and Relegation:**

It is evident that increased pesticide inputs have a negligible effect on total agricultural produce. But pesticide use causes 5 million poisonings and 320 thousand deaths and about 620 thousand chronic illnesses every year worldwide. The majority of these are informed in developing countries. Moreover, it is said that these emerging nations use only one-fifth of the pesticides useful in the world and the numbers of victims due to pesticides are further undervalued as many such cases are not described. Millions of farmers, millions of other people living in farming groups and the uncountable consumers are unprotected to the chemical insecticides through gasping polluted air, drinking polluted water, consuming contaminated food, etc. Irrespective of the normal realism, farmers from developing nations continue to use pesticides at an increasing rate. Before looking at the probable reasons, it is valuable mentioning how the World Bank has defined the reality of agrarian society of developing countries. It demonstrates the harsh reality of the rural scrap for livelihood and existence. Farmers are directly or indirectly forced by strangers to use chemical pesticides on their farms. Farmers in developing nations are often not well educated, trained, or conscious of danger, and they also lack assets and have limited power to control the outside forces like markets and

trade liberalization, universal policies, treaties, etc. The agrarian pest control system, which was established and advertised as a fractional by the outsiders, has in fact, locked farmers in pesticide technology. The responsible use of insecticides requires the capacity to read and follow label directions. Farmers also often lack the possessions to purchase equipment and supplies specified on the label to properly apply a pesticide. Pest identification is lacking and risks from pests are often not properly judged. Pesticide and application equipment disposal is too often determined by government or aid agency use of surplus goods from elsewhere and often not well suited to solve the problems at hand. We briefly discuss regional and global outsiders that are likely to augment pesticide use and intensify marginalization, and secondly, we try to elaborate the pathways of marginalization (Fig. 1) by ruin of human health at local level.

## 2.2 Macro-level Forces for Relegation

There is a deceptive lack of proper institutions prevailing the production and sales of insecticides in developing countries. Pesticides are some of the most toughly regulated chemicals in the world. But emerging countries lack laws and regulations that appropriately regulate pesticide imports/exports and use. The countries having such mechanisms may still lack strict execution. Additionally, export of chemicals banned in Western countries to developing countries without acceptable warnings and insurances would cause people to become downgraded.

Indeed, developed nations have, in the past, intentionally or otherwise, dumped highly toxic and deceased chemicals into less developed countries as aid. For instance, more than 74 metric tons of highly toxic and obstinate chemical pesticides were donated by multinational companies to India, essentially becoming an ecological time bomb that could go off in the near future. The ingredients of this ecological time bomb include DDT, dieldrin, and chlorinated organo-mercury compounds. A global investigation of DDT levels in human tissues exposed higher levels in Africa, Asia, and Latin America than in Europe and the United States. The use of these compounds has been either excluded or limited in many developed countries; however, still many industries from these countries market these products to the developing world. For example, from 1997 to 2000, the US pesticide companies disseminated over 30,500 metric tons of pesticides banned from use in the United States. Frey has examined the problem of the flow of pesticides from developed countries to less developed countries in terms of improved human and environmental health risks, and social and economic costs, and argued that political-economic forces characterized the increased flow to the less developed countries. Furthermore, while there is easy access to information about these

toxic chemicals in the developed world, very few farmers in developing countries are well informed or made aware of the risks. It is also a fact that farmers in developing countries adopt considerably fewer safety insurances while using pesticides. In spite of this, there are numerous companies advertising chemical pesticides through the media in developing countries, but very few promoting safety precautions while handling and applying pesticides.

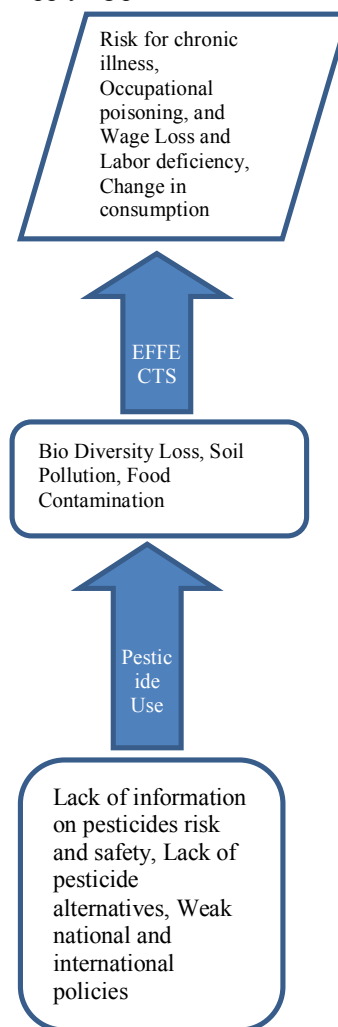


Fig 1: Effect of Pesticide Consumption

Indeed, the intelligent communities, including research scholars and scientists, have not yet accomplished adequate accuracy in estimating the potential health and environment damage and consequently in estimating its impacts. Scholars who tried to evaluate the pollution costs of pesticide use have also undervalued the effects because of incomplete accounting of the range of negative externalities. For instance, Devi designed the costs of pesticide pollution in India to be US \$ 37 per person per year. Further, studies in Africa have also generated a

similar range of costs. This cost appears very small compared to the increase in farm production, thus when a farmer is faced with a choice between the pollution costs and rises in farm production, they underestimate pesticide's effects and continues to use pesticides without proper safety provisions. The costs of pesticide pollution for the society is likely to be significantly higher than the costs assessed in many studies because most of them consider only a fraction of the full effects of pesticide use. For example, the World Development Report 2008 of the World Bank, which is regarded as a key document of global action for development, recommends a new vision to reform agricultural production at household level through aids to inputs like chemical pesticides. Such a policy move is likely to increase use of pesticides in the future, causing yet more hostile concerns.

### **2.3 Micro-level Pathways for Relegation:**

Now let us consider mechanisms that cause farmers to be disregarded by pesticide use. These are site-specific, therefore, related even within a country, local environment, or household. Ruin of the local environment may lead to marginalization. For micro-level mechanisms of marginalization, three pathways are discussed, namely: decay in health and yield, direct and indirect economic loss, and in extreme cases, changes in household social behaviour.

### **2.4 Decline in Health and Productivity:**

It is predictable that agricultural work related to insecticide use carries significant risk for injury and illness, and it is only recently that these matters have been addressed. As conversed earlier, pesticide use is associated to acute and chronic illness, suicide attempts, professional destroying, and lead to significant death and disease. Mortality is a complete health tragedy, but in case of illness, a farmer is unable to work with full energy; and, either takes rests at frequent intervals or takes bed rest with total loss of labor. In addition, sickness may decrease administrative or analytical skills of farmers affecting the decisions-making process. Thus, labor output loss due to pesticide-related illness, loss of time and labor of family member(s) nursing the fatality, and leisure time loss are some of the micro-level health-related ways of relegation.

### **2.5 Financial Loss:**

The World Bank acknowledges that out-of-pocket payments for health services specifically hospital care can make a difference between a household being poor or not. The medical expenses, transportation costs, value of time on traveling, and dietetic expenses due to illness are the payments when a person is offended with pesticide poisoning. Similarly, cost of defensive clothing, gloves, mouth and nose protection, etc., add prevention costs against pesticide risks. Additionally, crop losses/damage due to failure to look after the farm, costs related with hiring labor due to inability to work

on the farm, and any income unavoidable due to illness further increases the total losses and marginalizes the weak groups.

### **3. TACTICS TO DIMINISH PESTICIDE USE IN AGRICULTURE**

Illiteracy of pesticide induced developmental problems and the public evils have triggered serious damage to human society, therefore, during 1960s, at its very early stages, a new concept of pest control called Integrated Pest Management emerged. This was actually recognition of the public evils of pesticide use. The initial objective of Pest Management changed to the concept of pest control to that of crop and eco-health. Nowadays, Pest Management is alleged to enhance capability of local people for decision making in response to context-dependent pest problems, and also to their capability for adaptive management. Only a few scholars have deliberated the environmental and ecological aspects in evaluating the Pest Management benefits. Cuyno et al. measured Pest Management induced reduction not only to pesticide usage and yield, but also to risks to humans, birds, aquatic species, beneficial insects, and other animals. Recently, van den Berg and Jiggins broadly characterized the benefits of Pest Management into two types: instant and progressive. They argue that the changes of the Pest Management concept, from pest control to crop health and the recognition of its capabilities for managing agro-ecosystems, should now look beyond the immediate effects to broader developmental impacts such as revolution, community agenda setting, or policy changes. Yet, the adoption and coverage is not sufficient to meet the universal objective. Pest Management is knowledge exhaustive and ideally planned for literate farmers of the developing world. This could be a reason why some researchers have suggested reviewing the Pest Management curriculum and implementation strategies.

Pest Management programs such as FFS in developing countries are often donor-driven, which might not last for a long time. At first, the trained individuals are socially varied and physically scattered so they could not often disseminate the practices learnt in FFS; second, farmers face peer pressure for pesticide use on the farm as the neighbors always apply it to minimize crop failure risks; third, "top-down" approach has been used for picking entities for the IPM programs. Therefore, a "bottom-up" approach-the community Pest Management program-is suggested for introduction of Pest Management in low-income countries. Community Pest Management is a approach for viable agriculture development where farmers act on their own edge and analysis, identify and resolve applicable pest and crop-related problems, conduct their own local Pest Management research and education, establish or adapt local organizations that augment the

influence of farmers in local decision making, employ problem solving and decision-making processes, create opportunities for all farmers in their societies to develop themselves, and promote a justifiable agricultural system.

Although the methodology for impact assessment of the FFS is still under development, benefits to participants from instantaneous and developmental impacts of IPM training are likely to be higher than the costs of involvement. For other countries, studies such as Kishi et al., van der Hoek et al., Konradsen et al. have suggested either a shift from highly toxic pesticides to less toxic or to control the disposal of highly toxic pesticides. But in Nepal, farmers have been using relatively less toxic pesticides frequently without defensive measures. So, the adoption of community Pest Management as an alternative to chemical control, along with refining the population to make them aware of the safe handling of pesticides and safety gear and its impacts to health and environment, are the possible options to reduce pesticide use. Current national strategy of IPM-FFS extension approach is to curtail chemical pesticide use by altering cultivation practices (intercropping, rotation, fertilization, etc.); using natural control agents, selective breeding, etc. But for its long term sustainability, we should also look at the institutionalizing FFS groups, exploring continuous economic sources, involving crews of experts in training/evaluation, launching public-private partnership for extension and research, and searching markets for nontoxic agricultural products.

#### 4. CONCLUSION

The supremacy of simple economic analysis for estimating benefits of pesticide use seems to have had improved public troubles. If these public evils are not recognized and accounted for through a holistic systems view in the analysis of economic returns, susceptible communities or societies may be constantly marginalized. The paper mentions significant importance to substitute's ways of controlling pests, for instance Pest Management, along with education and training events. In a situation where the entire earth has become one via globalization and trade liberalization, it would be very useful to get farmers accustomed with ecological management of the local agro-ecosystems with a major focus on pesticide-induced unplanned developmental problems. And it also allow farmers to be up-to-date of the changes in market demands, opportunities, and threats arising from worldwide and national rules, principles, policies, treaties, etc.

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