

Pesticide use in Nepal: Health effects and economic costs for farmers in the central mid-hills

Abstract

The thesis evaluates the negative effect that intensive agriculture brings, particularly in terms of the effect of pesticide use on human and on the environment, and the associated economic cost. Vegetable production is an important source of farm income, but this has become increasingly reliant on the excessive use of chemical pesticides. This not only pollutes the environment but also affects farmers' health. The thesis hypothesises that the excessive and injudicious use of pesticides in intensive farming will adversely affect human health and increased economic costs for the farmer.

A study was carried out in Ansi khola and Jhikhu khola watersheds of central mid-hills of Nepal, during 2008 and 2009 to observe the effect of the use of chemical pesticides on intensive farming. The objectives were (i) to review factors affecting pesticide use in developing countries; (ii) to assess risks of pesticide use for farmers by assessing erythrocyte acetylcholinesterase activity (AChE); (iii) to value the risk of pesticide use for farmers and for environmental health; and (iv) to assess the impact of the associated economic costs of pesticide use for vulnerable populations within an agrarian society. Data was collected through household surveys, group discussions, and individual interviews. The Test-mate ChE Cholinesterase Test System was used to monitor erythrocyte AChE activity before and after pesticide application seasons. Cost-of-illness, defensive expenditures, and willingness to pay (WTP) approaches were applied for valuing health and environmental costs of pesticide use. To this, an opportunity cost of spraying time, and amount spent on purchasing chemical pesticides were added for estimating total cost of pesticide use.

The objectives have been addressed in four separate but interrelated studies. The synthesis of these studies revealed that farmers were significantly exposed to chemical pesticides. The use of chemical pesticides resulted in acute health symptoms, increased

economic costs, and the costs of pesticide use in proportion to household cash incomes was likely to be higher for the most vulnerable group within the society, the small farmers.

Specifically, the first paper reviews “*continuing issues in the limitations of pesticide use in developing countries*” and found that impact of pesticide use in crop production is complex and inter-connected. This topic requires an interdisciplinary approach; without this, farmers in the developing world will tend to incur economic costs as a result of health and environmental degradation.

The second study, “*Knowledge, attitude and practices of pesticide use and acetylcholinesterase depression among farm workers in Nepal*” found low levels of care with regard to pesticide use and high level of awareness among the farmer with regard to the environmental impacts of pesticide use. However, farmers failed to take adequate safety precautions. Current levels of use of pesticides were sufficient to cause acute health symptoms and AChE depressions.

The third study, “*Health and environmental costs of pesticide use in vegetable farming in Nepal*” takes account of both the health and environmental cost of pesticide use for farmers, and revealed that exposed farmers were likely to have to carry increased economic costs as a result of pesticide use. If provided with safe alternatives to chemical pesticides, farmers were willing to pay more than the cost of existing pesticides in order to protect their health and environment.

The final study, “*Distribution of costs of pesticide use by household economy*” showed an uneven distribution of the cost of pesticide use between households. On average, the health costs of illness associated with pesticide use was equivalent to nearly 5% of agricultural cash income, which was likely to be higher for small-scale households (5.7%) than the large-scale (3.6%). Similarly, the total economic costs of pesticide use for farmers amounted to 15% of agricultural cash income, and/or 5% of total household cash income. The medium-scale households likely to incur the highest economic costs of pesticide use; however, the cost in proportion to household cash incomes was likely to be higher for small-scale households.

The thesis recommends an increased emphasis on seeking alternative ways of controlling pests, such as the use of IPM along with further education, training and awareness for local farmers.