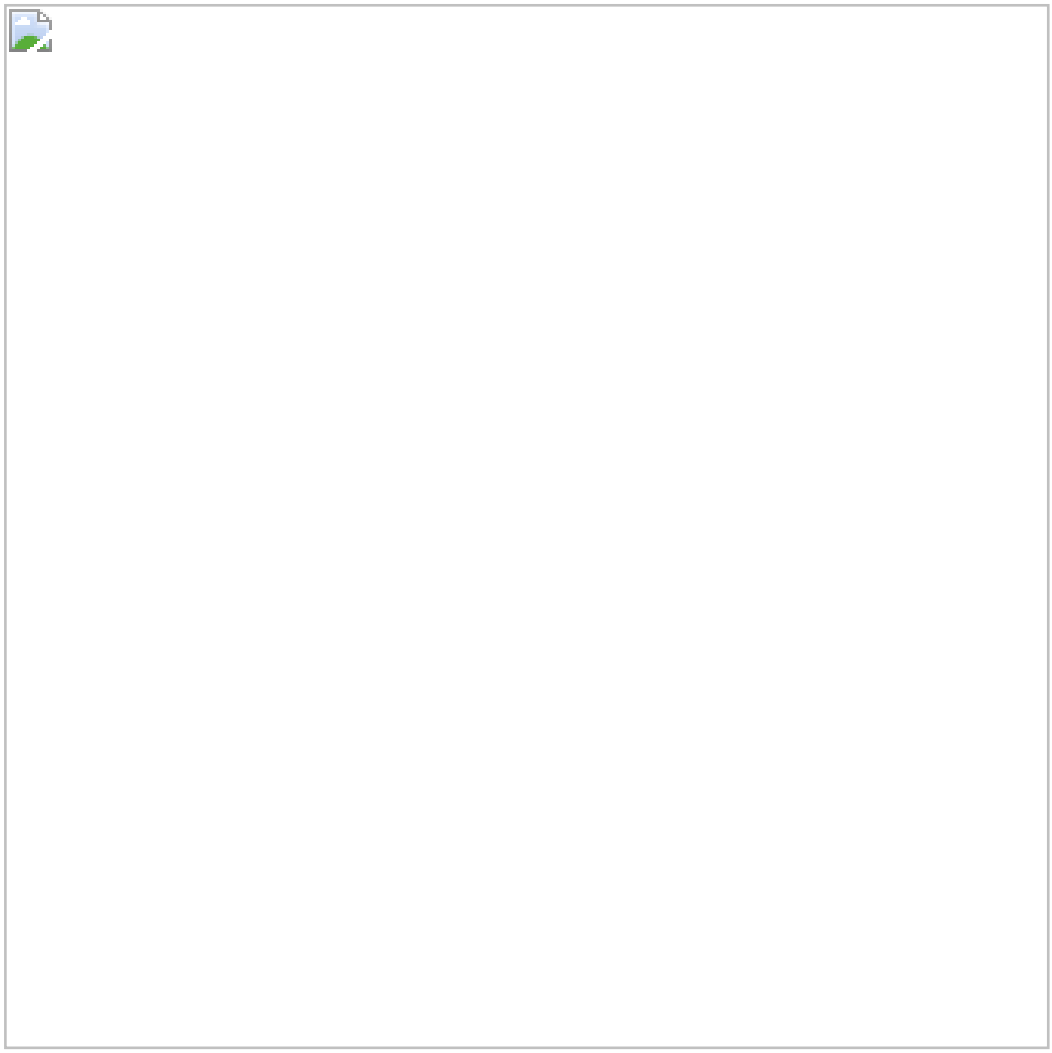

# Pesticide Poisonings in Low- and Middle-Income Countries

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Source: Environmental Health Insights, 12(1)

Published By: SAGE Publishing

URL: https://doi.org/10.1177/1178630217750876

# Pesticide Poisonings in Low- and Middle-Income Countries

Environmental Health Insights
Volume 12: 1–3

DOI: 10.1177/1178630217750876

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**AIMS AND SCOPE**

This editorial is an introduction to the papers making up the special issue on 'pesticide poisonings in low- and middle income countries'.

This Special Issue on "Pesticide Poisonings in Low- and Middle-Income Countries" gives voice to studies on a complex thematic with growing importance as low- and middle-income countries (LMICs) boost their often ineffective agricultural production with an increased use of pesticides.[1,2] With 16 papers from Latin America, Africa, and Asia, this publication contains a broad presentation of the main problems with pesticides. This includes numbers and reasons for the poisonings, classes and toxicity of pesticides used, knowledge and level of personal protection, diagnosis and treatment of poisonings, dangers to consumers due to pesticide residues in food, and the environment and possibilities for prevention. The studies point to the need to understand pesticide poisoning as a multifactorial public health problem resulting in an increased burden for vulnerable populations especially in LMICs. To deal with this, attention to both proximal causes and the distal policy and contextual factors is required.

In papers published so far, a relatively high percentage of farmers in LMICs reported acute symptoms of pesticide poisonings after spraying, and objective measures have confirmed this.[3–5] As can be seen from many studies and in the papers presented here, the incidence of poisonings among farmers varies in accordance with spraying circumstances. Various global estimates on incidence of pesticide poisonings have been made, and the most often cited numbers are 3 000 000 hospitalized acute pesticide poisonings, 25 000 000 less severe poisonings, and around 300 000 deaths from pesticide poisoning per year.[6–8] Farmers and spray men in public vector programs are the ones most at risk of less serious acute and chronic poisonings, whereas children often suffer from more serious accidental poisonings, and pesticides are the most popular means of self-harm in LMICs leading to most of the deadly pesticide poisonings.[6–8]

The number of poisonings might be overjudged in some epidemiologic studies due to inaccurate diagnosis and exposure measurements. A paper published few years ago in the World Health Organization (WHO)-Bulletin did set up a matrix for diagnosing pesticide poisonings that should meet at least one of the following criteria: (a) documentation of exposure, (b) health effects (at least 3 symptoms present and possibly a depressed ChE), and (c) causality.[9] The papers in this Special Issue highlight the importance of improving diagnostic skills among health care workers as better ascertainment of acute pesticide poisoning is a prerequisite for better surveillance data to improve policy decisions. It is shown that training of health care workers can successfully improve their diagnostic skills of pesticide poisoning cases.

Severe chronic diseases have been linked to pesticide exposure including cancer and impaired neurological development of children exposed in utero.[10,11] Apart from acute poisonings, exposures leading to such chronic effects might also stem from pesticide intake from residues in food and drinking water,[12] as also shown in some of the papers presented. Generally, there is little public concern on consumer safety in LMICs and there are weak or no government pesticide residue surveillance mechanisms. Empty pesticide containers leading to pollution are commonly found abandoned in the environment because of a lack of support from the authorities and unwillingness on the part of the pesticide companies to recycle containers. The study from Bolivia suggests that solutions involving collecting and recycling containers are possible and can generate benefits for both the farmers and the industry—a model that might be copied in other settings as well.

Preventive measures of occupational exposure with an education of farmers and other users on integrated pest management (IPM) with good agricultural practices and greater use of ecologic alternatives have proven effective not only in reducing number of poisonings but, in some cases, also in increasing profits.[13,14] Yet, IPM has not spread as should have been expected probably due to too weak control with pesticide imports and sales giving ground for sale of cheap, banned, or low-quality pesticides; IPM being too complicated to learn; a lack of public policy to invest in national IPM extension services for training farmers; a strong lobbyism by the pesticide companies; pesticides providing an effective and simple answer to the problems farmers are facing; and IPM being too costly to diffuse, among others,[13] and as shown in one of the presented studies pointing out a disproportion between labor efforts and market prices of the IPM grown products.

Upstream interventions show the most promise, eg, banning of the most toxic WHO class I pesticides has been shown to decrease the number of poisonings due to suicide in Sri Lanka with no evidence of method substitution.[15,16] However, toxic pesticides are still produced in high- and middle-income countries to be marketed in low-income countries. Interventions to prevent self-harm and accidental poisonings through restricting access have been tried out with varying success, largely because of failure to take account of adequate training and awareness about why locking up pesticides is vital.[17] Social determinants that trigger self-harm (eg, poverty, domestic violence, hunger) must also be addressed if this problem of suicide is to be comprehensively prevented.

The papers presented in this Special Issue largely confirm a need for strategies most effective for preventive actions as adequate knowledge on toxicity, prevention, and treatment of pesticide poisonings is lacking among users, health care workers, and the population in general. As indicated, IPM education is a powerful tool but might be difficult to implement on a large scale if no central political action is taken to support its dissemination and uptake. In addition, government policies that promote increased use of synthetic inputs in agriculture as well as the vigorous marketing strategies of the pesticide industry undermine IPM promotion and adoption efforts.

It is understandable that a modernization of agriculture in LMICs with their often hot and humid climates might also imply an increased use of pesticides as was seen in the green revolution in high-income countries decades ago. Documentation of the problems arising from increased pesticide use suggests that solely promoting increased use of pesticides may be associated with greater harm than benefit. Possible solutions that avoid negative health effects and environmental damage have been successfully tested and are ready to implement.

The main responsibility to promote safe and sustainable agricultural production lies with governments and intergovernmental agencies. They have to dual role to play—on the one hand, to invest in awareness-raising among the general population, continuously support, and educate pesticide users on the hazards of pesticide use, how to reduce exposures, and availability of alternatives to pesticides as well as better training of health care workers in the diagnosis, treatment, and surveillance of pesticide poisoning; on the other hand, government needs to regulate the pesticide industry and ensure they contribute to programs to reduce exposure to hazardous pesticides and not just rely on educational interventions. The United Nations (UN) Guiding Principles for Business and Human Rights point to responsibilities of pesticide companies to support such efforts and UN organizations and civil society organizations can assist.[18] However, it does require political will and the lead must be taken by politicians and policymakers in LMICs.

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**TYPE:** Editorial

**FUNDING:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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