Pesticide Use in Vegetable Farming by Nepali Farmers: Health and Environmental Impacts

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Abstract

This paper examines the use of chemical pesticides in vegetable farming by Nepali farmers, focusing on the associated health risks and environmental impacts. Despite low national pesticide consumption (396 g a.i./ha), vegetable farming in Nepal involves intensive pesticide use, with fungicides and insecticides being the most common. Studies reveal significant health risks, including acute symptoms like headaches (69.5%) and skin irritation (42.8%), and environmental concerns such as soil and water contamination. The lack of personal protective equipment (PPE) use, inadequate training, and improper disposal practices exacerbate these issues. Integrated Pest Management (IPM) adoption remains low, necessitating stronger policy enforcement and farmer education to mitigate risks.

1 Introduction

Nepal, an agrarian country, relies heavily on agriculture, with over 66% of its population engaged in farming (**?**). Vegetable farming, particularly in commercial areas, has seen a sharp increase in pesticide use due to the shift toward high-yield, market-oriented crops (**?**). While pesticides enhance productivity, their misuse poses significant risks to human health and the environment (**?**). This paper synthesizes findings from studies on pesticide residues, health effects, and management practices among Nepali vegetable farmers, highlighting challenges and proposing solutions.

2 Materials and Methods

This review draws on secondary data from cross-sectional studies conducted in Nepal, including surveys in Tokha Municipality (**?**), Chitwan (**?**), and other districts. Data were sourced from peer-reviewed articles and reports, focusing on pesticide types, application practices, health effects, and residue levels in vegetables. Statistical analyses from original studies, including chi-square tests and prevalence rates, were used to assess health impacts and IPM adoption. The review also incorporates regulatory data from Nepals Plant Quarantine and Pesticide Management Centre.

3 Results

3.1 Pesticide Use and Types

Nepals average pesticide use is 396 g a.i./ha, with vegetables accounting for the highest consumption (up to 1,600 g a.i./ha in commercial areas) (**?**). Fungicides (61.38%) and insecticides (29.19%) dominate, with 51% classified as moderately hazardous (WHO Class II) and 28% as highly hazardous (Class Ib) (**?**). Banned pesticides like dichlorvos and DDT persist in some areas, with residues detected in soil at concentrations up to 177 μg/kg for chlorpyrifos (**?**).

3.2 Health Impacts

A study in Tokha Municipality (n=333) found that 73% of farmers reported health effects from pesticide exposure, with common symptoms including headaches (69.5%), skin irritation (42.8%), and burning eyes (31.3%) (**?**). Only 8% sought medical care, and none used a complete set of PPE. Low acetylcholinesterase levels, indicating organophosphate exposure, were observed in 10.3% of farmers (**?**). Women face higher exposure risks due to their involvement in vegetable production (**?**).

3.3 Environmental Impacts

Pesticide residues contaminate soil and water, with DDT detected at all soil depths despite its 2001 ban (**?**). Improper disposal, such as leaving containers in fields (73% of farmers in Rupandehi) or burning them (45.1% in Kirtipur), exacerbates environmental pollution (**??**). Vegetables show residues, with 4% of samples exceeding EU Maximum Residue Limits (MRLs) (**?**).

3.4 Pesticide Management Practices

Only 17% of farmers in Chitwan received IPM ch