SOWING HARM

The Multifaceted Impact of Pesticides in Four Countries

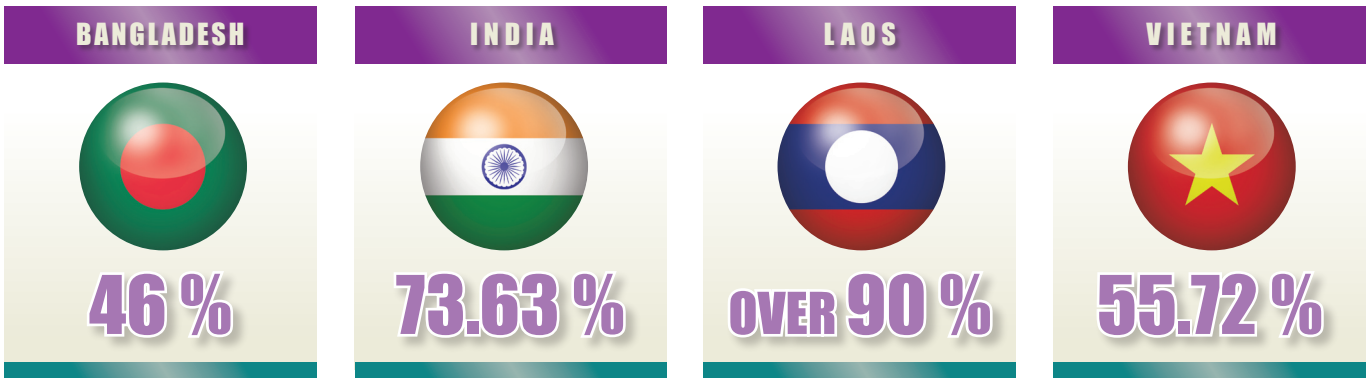
This is a summary of the secondary research project "Sowing Harm: The Multifaceted Impact of Pesticides in Four Countries" with PANAP partners in the four countries, obtaining information on the pesticides impacts from various sources published studies, surveys, media reports and other relevant data.

Pesticides are widely used to manage harmful pests and reduce production losses or product damage, in the mistaken belief that pesticides are necessary to grow food, despite evidence to the contrary that sufficient, healthy food can be grown without them.

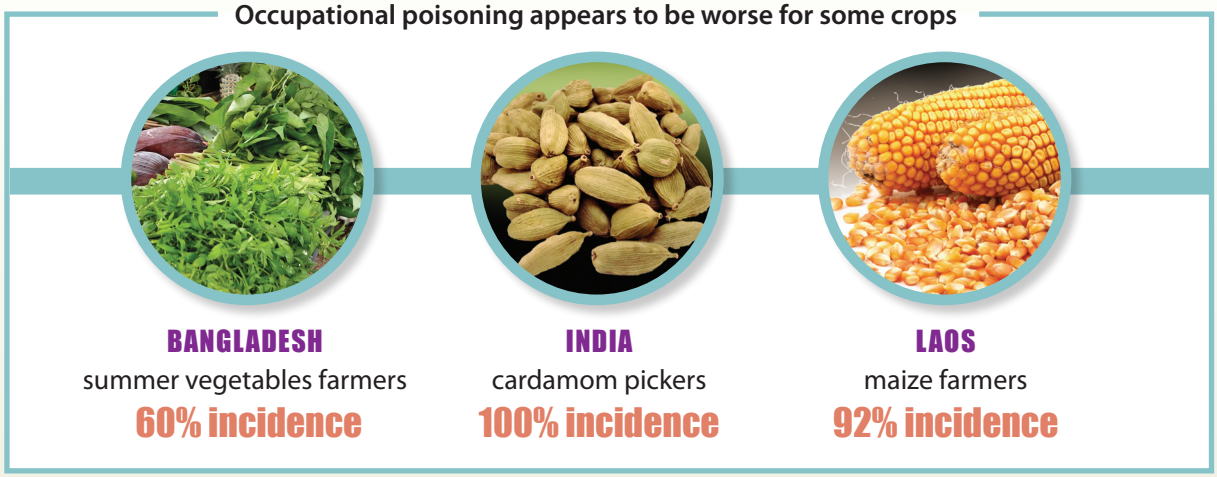
When pesticides are used, everyone is exposed to them: farmers, workers, pregnant women picking cotton or cardamom, small children picking flowers, children playing in the yard, or their homes, women washing pesticide-soaked clothing. And everyone through eating food containing pesticide residues and drinking similarly contaminated water.

Acute Occupational Pesticide Poisoning (AOPP)

Most recent studies that were reviewed, revealed the acute occupational pesticide poisoning incidences:



Not recorded in these studies are the deaths during spraying, such as those in Bangladesh and India reported by local media.



Children are also occupationally poisoned: 87.5% incidence in floriculture in Tamil Nadu.

Chronic health effects arise from ongoing exposure to low levels of pesticides and the incidence rates of AOPP are testament to that exposure. These effects include: cancers (breast, prostate, bladder, colon, lung, and pancreatic cancers, and leukaemia and non-Hodgkin's lymphoma); reduced nervous system functioning; disturbed neurodevelopment of children; diabetes; asthma; decreased male and female fertility; spontaneous abortion; birth defects; Parkinson's disease.

> **One recent study in the US[1] put pesticides on a par with cigarette smoking for some types of cancer causation.**

OAPP surveys in the four countries noted asthma, cancer, diabetes, hypertension, poor vision, immune suppression, hormone disruption, reproductive abnormalities, reduced sperm count and motility, abnormal sperm shape, urine control problems, reduction of sexual urge and physical weakness.

Main pesticides causing the poisoning problem:

- organophosphate, particularly: chlorpyrifos, diazinon, dimethoate, quinalphos, malathion, monocrotophos;
- carbamate: carbofuran, carbosulfan, carbaryl;
- pyrethroid: cypermethrin, lambda-cyhalothrin;
- and others: fipronil, imidacloprid, thiamethoxam, profenofos, phorate, permethrin, 2,4-D, paraquat, glyphosate, atrazine.

Residues in food

Studies shown high levels of residues have been found in many food types across all four countries, in particular of organophosphate and pyrethroid insecticides, because farmers:

- Use more than the recommended amount (5-6 times more in Bangladesh).
- Use adulterated formulas.
- Do not adhere to the required withholding period between last application and harvest.
- In Laos 59% of vegetable farmers in Xieng Khouang province overuse pesticides leading to high levels of residues.
- In Bangladesh, 93.3% of summer vegetable growers did not even consider a withholding period; perhaps because most (70%) were unaware of health risks from eating pesticide-contaminated vegetables.

In Laos more people consuming vegetables from the market tested positive for the impact of organophosphate and carbamate insecticides (42%) than did the farmers using them (32%) because of residues.

In Laos 33% of school children tested had unacceptable levels of cholinesterase inhibition because of organophosphate and carbamate residues in food.

In Vietnam 50% of 570 fresh food samples tested contained pesticide residues, with 3.5% above MRLS and 10.2% not permitted for that use. Some contained seven different pesticides.

1. Gerken J, Vincent GT, Zapata D, Barron IG, Zapata I. 2024. Comprehensive assessment of pesticide use patterns and increased cancer risk. *Front Cancer Control Soc* 2:1368086.

So concerned were the authorities in Bangladesh about residues of toxic pesticides in mangoes that in 2019 the police were deployed, by a High Court order, to prevent the overuse of pesticides

Cardamom from the Idduki district in Kerala, India contained residues of 15 different pesticides, mostly organophosphate or pyrethroid, and mostly banned in many countries. One study found quinalphos in cardamom at 25 times the MRL.

Lindane, DDT, endosulfan, cypermethrin, cyhalothrin, permethrin, chlorpyrifos, ethion, profenophos and fipronil were found in cow milk, with levels of fipronil, lindane, DDT and ethion posing risks for children

Most problematic residues in food are organophosphate insecticides (chlorpyrifos, quinalphos, malathion, diazinon, dimethoate, fenitrothion, profenophos), acephate, carbendazim, cypermethrin, lambda-cyhalothrin, imidacloprid, permethrin, fenvalerate, acetamiprid, difenoconazole and carbendazim.

Residues in house dust

Analysis of dust samples in houses in Vietnam found 47 different pesticides, including carbendazim, carbofuran, chlorfluazuron, chlorpyrifos, cyhalothrin, cypermethrin, hexaconazole, permethrin and DDT.

Residues in the environment

Soils and water in the four countries are heavily contaminated with pesticide residues.

When such overuse of pesticides occurs as to result in acute and chronic health effects and significant residues in food, not surprisingly it also results in residues in the environment that can affect all organisms from human, to wildlife, to livestock, to companion animals, to beneficial insects that are vital for pollination and managing pests, to the very tiny microorganisms that keep the soil healthy and on which plants depend for the uptake of nutrients through their roots.

- In Bangladesh diazinon, carbofuran and carbaryl were found in soil samples in vegetable and paddy fields sometimes exceeding the European Economic Commission allowable level.
- In India, soils in the cardamom plantations of the Idduki area were contaminated with endosulfan, DDT, chlorpyrifos, quinalphos, ethion, profenophos, lambda-cyhalothrin, bifenthrin, imidacloprid and indoxacarb. Soils in apple and mango orchards in Himachal Pradesh contain residues of DDT, HCH, endosulfan, chlorpyrifos, cypermethrin, cyfluthrin, dicofol and chlorothalonil.
- In Laos, soils contain carbendazim, glyphosate, paraquat, dicofol and cypermethrin.
- In Vietnam isoprothiolane, chlorpyrifos and propiconazole were found in paddy rice field soil and irrigation ditch sediments in the Red River delta. Azoxystrobin (fungicide) was also found in the sediment.

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Pesticide residues are also widespread in water in all the countries:

- Bangladesh: carbaryl, chlorpyrifos, carbofuran, cypermethrin, diazinon, and malathion, fenitrothion and parathion found variously in waterways, pond water, water from paddy fields, lakes, rivers, with one estimation that 25% of pesticides sued might reach the sea
- India: pesticides found in groundwater included malathion, atrazine, diazinon, methyl parathion, lindane, chlorpyrifos, butachlor and alachlor. HCH, DDT, endosulfan, malathion, atrazine, and butachlor, were found in more than 90% of river water samples, while malathion, lindane, and methyl parathion were detected in around 50% of samples. Chlorpyrifos and diazinon were also detected in surface waters
- In Laos, paraquat, cypermethrin, chlorpyrifos, imidacloprid, atrazine and the breakdown products of DDT, dieldrin, heptachlor and lindane have all been found in sediment samples, and atrazine contamination in a village water supply.
- In Vietnam, the primary contaminants of water are quinalphos, isoprothiolane, diazinon, fenitrothion, imidacloprid, endosulfan, fenobucarb, trichlorfon and dichlorvos.

Climate change

Pesticides are fundamental to supporting the intensive agriculture propped up by synthetic fertilisers and especially nitrogen-based ones that create weak, pest and disease-prone plants. The widespread use of herbicides reduces carbon sequestration in soils. But there is very little information available on pesticides and climate change, anywhere, let alone in the four countries.

- One kilogram of synthetic pesticide requires about 10 times more energy to manufacture than one kilogram of nitrogen fertilizer.
- But World Bank's report on Climate Smart agriculture says only this about pesticides: disease-resistant varieties reduce greenhouse gas emissions by reducing the use of synthetic pesticides (fungicides).
- In Vietnam the use of pesticides on citrus trees in Bac Tan Uyen results in greenhouse gas emissions of 3,239 tons of CO2e/year.

Recommendations

- Significantly increase the number of well-designed surveys of occupational poisoning across a number of different crops, with gender disaggregated data.
- Ban the pesticides causing the occupational poisoning, food residues and soil and water residues, as listed above:
  - Immediately ban organophosphates, especially chlorpyrifos, quinalphos, malathion, dimethoate, diazinon, monocrotophos; the carbamates carbofuran and carbosulfan; and the pyrethroids cypermethrin and lambda-cyhalothrin.
  - Then phase out the other pesticides causing OAPP, including imidacloprid, thiamethoxam, profenofos, phorate, permethrin, 2,4-D, paraquat, glyphosate, atrazine.
- Dramatically ramp up efforts nationally and internationally to help farmers implement agroecological alternatives: there is no point replacing these pesticides with others that will also cause poisonings.
- Reduce climate emissions by reducing pesticide use.
- Greater funding for CSOs to continue their work to reduce the use of damage caused by toxic pesticides and in implementing agroecological alternatives.