GATEKEEPER SERIES No. 1

Pesticide Hazards in the Third World:

New Evidence from The Philippines

JENNIFER A. McCRACKEN
GORDON R. CONWAY

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The Swedish International Development Authority (SIDA) funds the series, which is aimed especially at the field staff, researchers and decision makers of such agencies.

Jennifer A.McCracken is Research Associate and Gordon R.Conway is Director of the Sustainable Agriculture Programme, IIED

PESTICIDE HAZARDS IN THE THIRD WORLD: NEW EVIDENCE FROM THE PHILIPPINES

Jennifer A. McCracken & Gordon R. Conway

There is increasing evidence that mortality and illness from pesticides in the less developed countries are much more common than previously supposed. Many hazardous pesticides banned or severely restricted in industrialised countries are widely available in the developing countries. Organochlorine insecticides and phenoxy herbicides have largely been phased out in the industrialised countries but are still widely used in the developing world. India consumed 3000 tons of DDT, 27,000 tons of HCH and 400 tons of 2,4-D in 1981. The widely used insecticides in the Philippines in the 1970s were carbofuran, endrin, parathion and monocrotophos, all classified by the World Health Organisation as extremely or highly hazardous. The hazards are compounded by the lack of legislation, widespread ignorance of the hazards involved, poor labelling, inadequate supervision and the difficulty of wearing full protective clothing in hot climates. The risk to the public is also increased by the post-harvest treatment of crops. A common practice, for example, is to treat leafy vegetables with insecticides to enhance their appearance before going to market.

Fatality rates from accidental pesticide poisonings of over 20 per 100,000 population have been quoted for Sri Lanka, Nicaragua, Guatemala and El Salvador. But underreporting means such figures are likely to be severe underestimates. High patient-doctor ratios and poor access to hospitals and health centres means that many cases go unnoticed or are superficially treated. Diagnosis is often poor due to lack of diagnostic tools and unfamiliarity of health workers with the symptoms of pesticide poisoning.

The currently-accepted figure of 10,000 deaths annually worldwide due to accidental insecticides poisoning is now challenged by a recent report from the Philippines, based on circumstantial evidence. The study, conducted by Michael Loevinsohn of the Centre for Environmental Technology at Imperial College in London, was carried out in the Central Luzon region of the Philippines. This is one of the major rice producing regions which has greatly benefited from the Green Revolution packages of high yielding seeds, improved irrigation, and the provision of pesticides and fertilisers. Total rice production in the Philippines doubled between 1960 and 1980.

Pesticide use began to increase in the early 1970s following the introduction of the new varieties, a government credit scheme and a number of pest and disease outbreaks. Between 1970 and 1974 the value of insecticides applied to rice increased by over 250% but thereafter remained fairly constant due to rising prices and scarcity of credit. Loevinsohn investigated mortality in several contrasting rural and urban municipalities. He looked particularly at records of diagnosed pesticide poisoning and also at other conditions that could be caused by pesticide poisoning. Organochlorine insecticides, such as endrin, can

cause tonic and chronic convulsions and poisoning may be misdiagnosed as epilepsy, brain tumours and strokes. Poisoning by organophosphates, such as parathion, may be misdiagnosed as cardiovascular and respiratory diseases.

The results of the study were as follows:

- in the rural areas non-traumatic mortality rates increased among males aged 15–54 years by 27.4% between 1961–1971 and 1972–1984, but decreased among children and women (Figure 1).
- this increase for rural males coincided with the increase in pesticide use.
- in the rural areas, deaths diagnosed as poisoning increased by 247% and those from associated or potentially confounded conditions by 41% between 1961-71 and 1972-84. In contrast mortality from all other causes, except cancer, decreased 33.7%.
- while mortality attributed to stroke increased for all men in the urban and rural areas the increase was greater among younger men who are generally at low risk of stroke
- similarly, while mortality attributed to stroke decreased for all men for the two years following a 1982 ban on endrin, the decrease was significantly greater among the younger men. These changes occurred only in the rural areas.
- the incidence of leukaemia, possibly also associated with insecticides, increased among rural men (but not women) over the 1961–1971 to 1972–1984 period.
- through the year, mortality patterns for rural males peaked during August, the month of greatest insecticide use in the wet season. After double-cropping became widespread two mortality peaks occurred: in February when insecticides were used during the dry season crop and again in August (Figure 2).

This analysis links an increase in mortality in Central Luzon with occupational exposure to insecticides. However, other factors may have contributed: falling rural incomes, increased stress during land preparation, increased use of tobacco, and greater efficiency in the reporting of vital events. Nonetheless these other factors could not account for the selectiveness of the increases in mortality by age, sex, cause, month and place of residence.

Extrapolating this report's figure of a 27% increase in non-traumatic mortality among rural men to other rice-growing areas of the Philippines and elsewhere in Asia where pesticides have been widely used, suggests an annual excess mortality of many tens of thousands. The social and economic impact of this theoretical figure is much greater as those affected are economically active men, often the heads of households.

There are, however, welcome signs that the hazards are now being taken seriously. In Indonesia, for example, 57 insecticides have recently been banned from use on rice.

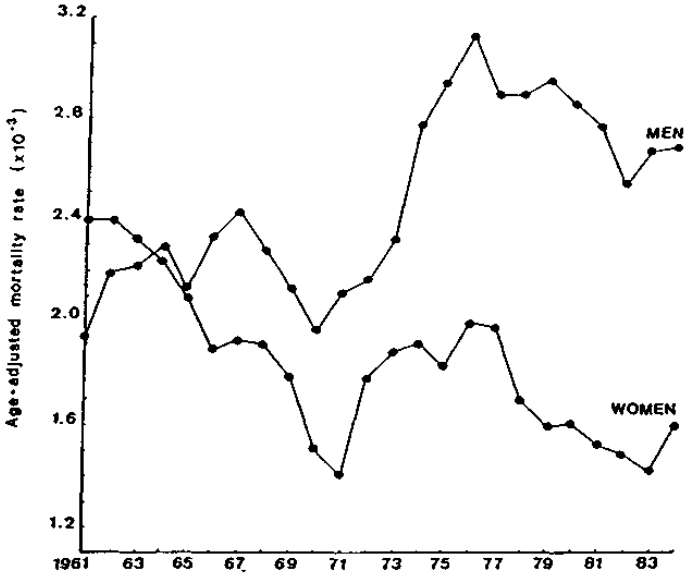

Figure 1 **Three-year moving averages of age-adjusted non-traumatic mortality among men and women aged 15–54 years in three rural municipalities in Nueva Ecija, Central Luzon**

Source: Loevinsohn, 1987

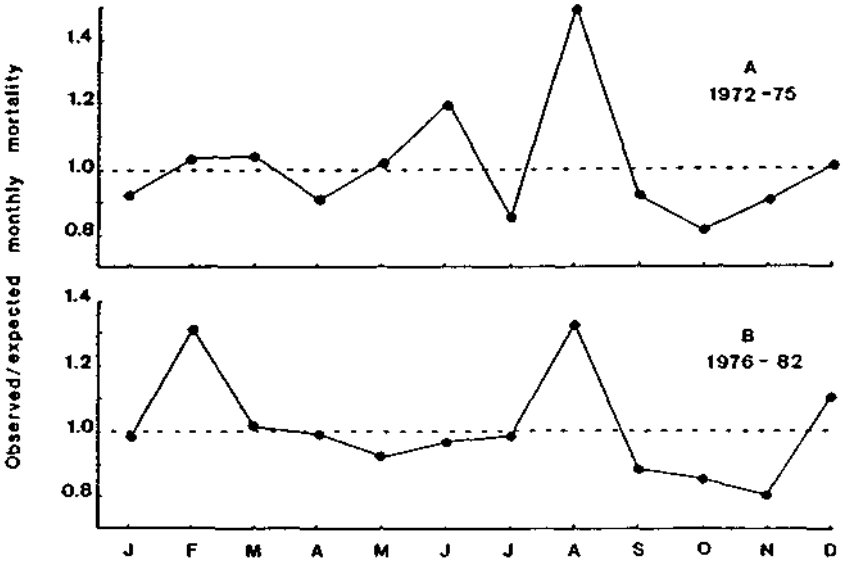

Figure 2 **Ratio of observed-to-expected number of deaths among men aged 15–54 years in rural areas of Cabanatuan, Nueva Ecija**
1972–75 = period of intensive insecticide use and predominantly single-cropping; 1976–82 = period of intensive insecticide use and predominantly double-cropping

Source: Loevinsohn, 1987

For the longer term improvements will only come from tougher legislation, and more importantly, rigorous enforcement, coupled with education and training aimed at all levels of rural society. In the meantime some benefits may arise from changes in policy that begin to place on the pesticide user the true costs, including the wider environmental and social costs as well as the direct economic costs. As a move in this direction the World Bank has begun to advocate the removal of subsidies on pesticide use which are commonly given to importers, manufacturers, formulators and to the end users. The theory is that this will make pesticide use more efficient, reduce the tendency to overuse and hence result in less pollution, less risk of pesticide resistance and fewer human deaths and illnesses.

References

Loevinsohn, M.E. 1987. Insecticide use and increased mortality in rural Central Luzon, Philippines. *The Lancet*, June 13: 1359-1362.

Bull, D.A. 1982. *Growing Problem. Pesticides and the Third World Poor*. Oxfam Public Affairs Unit. Oxford.

Jeyaratnam, J. 1985. Acute pesticide poisoning: a Third World problem. *World Health Forum*, 6:39.

Conway, G.R. and J.N. Pretty. 1989. *Unwelcome Harvest: A Review of Agriculture and Pollution*. Earthscan Publications Limited.

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Sustainable Agriculture and Rural Livelihoods Programme

The Sustainable Agriculture and Rural Livelihoods Programme

The Sustainable Agriculture and Rural Livelihoods Programme of IIED promotes and supports the development of socially and environmentally aware agriculture through policy research, training and capacity strengthening, networking and information dissemination, and advisory services.

The Programme emphasises close collaboration and consultation with a wide range of institutions in the South. Collaborative research projects are aimed at identifying the constraints and potentials of the livelihood strategies of the Third World poor who are affected by ecological, economic and social change. These initiatives focus on the development and application of participatory approaches to research and development; resource conserving technologies and practices; collective approaches to resource management; the value of wild foods and resources; rural-urban interactions; and policies and institutions that work for sustainable agriculture.

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International Institute for Environment and Development
3 Endsleigh Street
London
WC1H 0DD

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