Sri Lanka’s bans of WHO toxicity Class I (& some Class II) pesticides

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Green Revolution brought highly hazardous pesticides (HHP) into rural households

- New plant strains
- Fertilisers
- Pesticides
Initially a great success, also almost eliminating malaria
But there have been widespread harms from community use of HHP
Major long term effects on the environment

Blacksmith Institute’s
World’s Worst Pollution Problems Report 2010

Top Six Toxic Threats
Six pollutants that jeopardize the health of tens of millions of people

Lead
Mercury
Chromium
Arsenic
Pesticides
Radionuclides

Produced in collaboration with Green Cross Switzerland
HHP poisoning in Sri Lanka first reported in 1962

“Folidol” (Parathion) Poisoning

Sir,—Numerous cases of poisoning by “folidol” (parathion) have occurred recently in Ceylon. This insecticide is one of the group of phosphoric esters. In Ceylon it is used against pests which affect the tobacco plants. As tobacco is chiefly grown in the northern and eastern provinces in Ceylon, poisoning by folidol is chiefly encountered in these parts.

In the hospital in which I work there were 62 cases of folidol poisoning seen over a six-month period from January to June, 1960—51 accidental and 11 suicides; 9 of the 62 proved fatal. The fatality rate is presumably much higher in other locations where immediate medical attention is not available or where the knowledge of the emergency treatment of such cases is not yet widely known to medical personnel. It is rather alarming that during this period of study folidol accounted for 72% of all cases admitted to this hospital for poisoning and for 93% of all deaths from poisoning over this period.

—I am, etc.,

A. V. A. VETHANAYAGAM.

Government General Hospital, Jaffna, Ceylon.

- 62 cases of methyl parathion admitted in 6 months of 1960
- 51 unintentional, 11 intentional self-harm
- 9 deaths
Decades earlier than many, he recognised the impossibility of ‘safe use’

In my opinion folidol should be classed as a poison and controlled accordingly. It is too dangerous for use in the hands of the average Ceylon farmer. If there is no equally effective substitute, the possibility of spraying of folidol only by trained units from the agricultural departments must be explored, so that it will not be available to the individual farmer or member of the public over the counter. It should also be made obligatory to supply even with the smallest quantity of folidol sold anywhere a copy in the local languages of the precautions that should be observed when handling it. These precautions should be taught at all schools of agriculture throughout the island.

- “In my opinion, folidol should be classed as a poison ....”
- “It is too dangerous for use in the hands of the average Ceylon farmer, [and should] not be available to the ... farmer or ... public over the counter”

How prescient and true!!
But nothing then done about it ...
Led to a massive rise in suicides (and occupational) poisoning deaths – due to HHP availability & ease of access
Survey of pesticide poisoning in Sri Lanka

J. Jeyaratnam,¹ R. S. de Alwis Seneviratne,² & J. F. Copplestone³

This study included a sample survey of the clinical records of patients admitted to the different hospitals in Sri Lanka, and showed that approximately 13,000 patients are admitted to hospital annually for pesticide poisoning and that each year 1,000 of them die. Suicidal attempts account for 73% of the total, and occupational and accidental poisoning accounts for 24.9%. It is recommended that urgent action be taken to minimize the extent of the problem.
1975 – 14,653 cases  938 deaths
1980 – 11,811 cases  1112 deaths

73% intentional,  17% occupational,  8% accidental

Highest district incidence  367/100,000 population/year

WHO – If typical of other tropical LMIC, then 220,000 deaths/yr
1984 - Sri Lanka banned both parathions thro’ Control of Pesticides Act

The rise in pesticide suicides stopped

But now two other pesticides became important for occupational and intentional poisoning:

Monocrotophos and Methamidophos

So in 1995, the government banned these pesticides plus all other WHO Class Ia and Ib toxicity pesticides, again using the Control of Pesticides Act.
Effect of bans on all Class I WHO toxicity pesticides
By 1995, Sri Lanka had banned all WHO Class I pesticides

The rise in pesticide suicides stopped

But now two other pesticides became important for occupational and intentional poisoning:

Monocrotophos and Metamidophos

So in 1995, the government banned these pesticides plus all other WHO Class Ia and Ib toxicity pesticides

- Produced an immediate & precipitous fall in pesticide suicide and poisoning deaths
- The number of poisoning cases did not fall – just the number of deaths
- Pesticide poisoning was no longer typically lethal
Agricultural yield was not affected - 1

Cereals

- Bangladesh
- India
- Pakistan
- Sri Lanka

Roots & tubers

Manuweera 2009, EHP
Agricultural yield was not affected - 2

Manuweera 2009, EHP
Agricultural yield was not affected - 3

Manuweera 2009, EHP
Years: 2002-3

Study of 1070 consecutive patients admitted for acute pesticide poisoning to 2 general hospitals in the North Central Province of SL

68 (6.4%) patients reported occupational or unintentional poisoning

No patients died

Few required any treatment – all got better quickly with supportive care

Eddleston 2005, BJPsych
Since then three more sets of bans – all of problematic WHO Class II

**Saved over 93,000 lives at less than US$ 1.3 per DALY**

Still no effects on agriculture observable
Years: 2011-16

Prospective community-based study of a population of 223,000 in the North Central Province of SL over 3-5 years

43 cases of occupational or unintentional pesticide poisoning reported, most at small peripheral hospitals, not requiring transfer (compared to 1252 cases of deliberate ingestion, 646 requiring transfer)

85 deaths for pesticide suicides

But no deaths from occupational or unintentional poisoning

Pearson 2017, Lancet
Sri Lanka’s approach is strongly supported by United Nations

**International Code of Conduct on the Distribution and Use of Pesticides**

Published in 1985 by the UN Food and Agricultural Organisation (FAO)

1985

[Logo of FAO]

2014

[Logo of World Health Organization]
Sri Lanka’s approach is strongly supported by United Nations

International Code of Conduct on the Distribution and Use of Pesticides

Published in 1985 by the UN Food and Agricultural Organisation (FAO)

“Pesticides whose handling and application require the use of uncomfortable and expensive protective clothing . . . should be avoided, especially in the case of small scale users in tropical climates”

Article 3.5  1985
Article 3.6  2014

This excludes all WHO Class I pesticides from tropical agriculture
Current joint FAO & WHO response to problem of HHPs

Food and Agriculture Organization of the United Nations
World Health Organization

International Code of Conduct on Pesticide Management
Guidelines on Highly Hazardous Pesticides

2016
Current joint FAO & WHO response to problem of HHPs

Contains a series of criteria defining HHPs.

Criterion 8:

“Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment

This clearly includes all pesticides that cause hospitalisation or death, or contamination of the environment

HHPs should be removed from agricultural practice
Conclusion

1. The ban of WHO Class I toxicity pesticides in Sri Lanka had a rapid & major impact on reducing deaths from all forms of pesticide poisoning

2. It was highly effective at preventing moderate-severe occupational and unintentional poisoning

3. No discernible effect on agricultural output

4. Highly cost effective (<$50 per life saved for suicide)

5. Approach is strongly supported by international guidelines

6. Effect on the environment has not yet been studied but likely beneficial
Pesticide regulations vs suicides in Sri Lanka

** Saved over 93,000 lives at less than US$ 1.3 per DALY **