

# An Overview of Pesticide Regulation in Sri Lanka



**Sumith Jayakody**

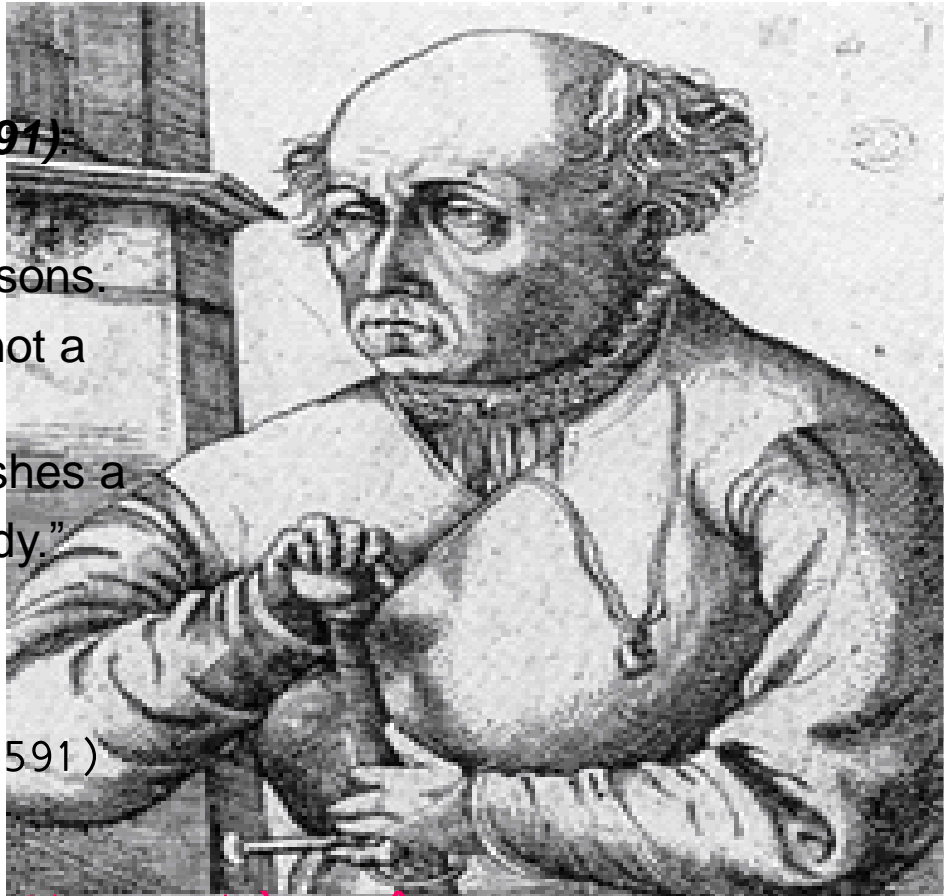
Office of the Registrar of Pesticides

# Introduction

Paracelsus (1493-1591)

“All substances are poisons.  
There is none that is not a  
poison.

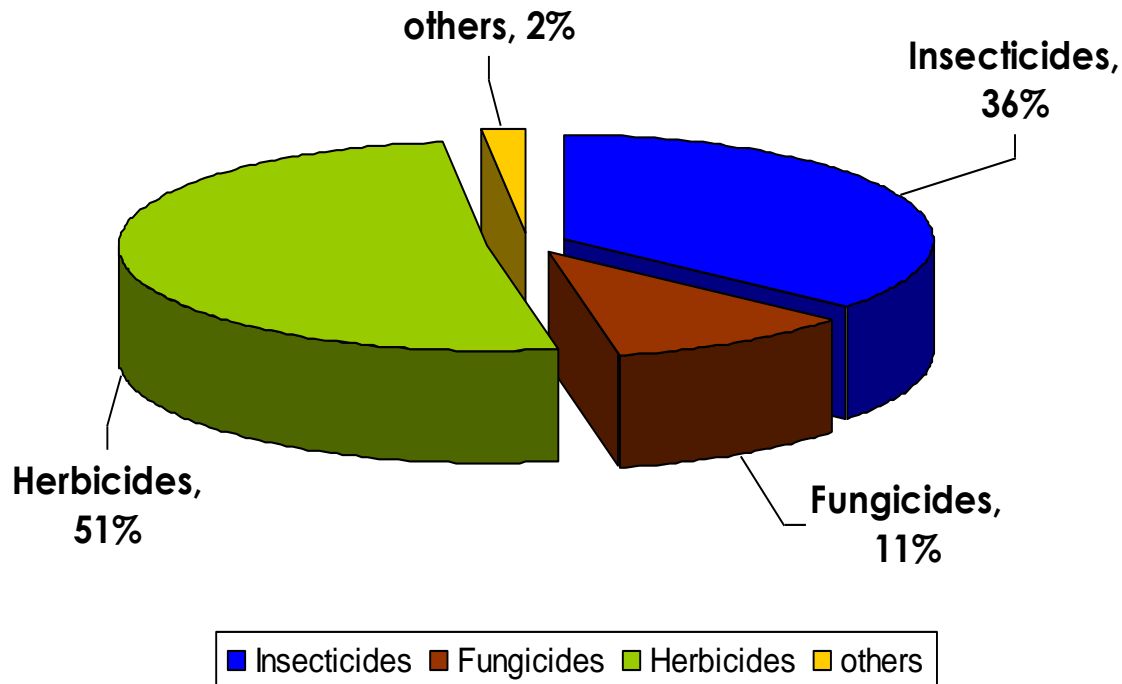
Only the Dose distinguishes a  
Poison from a Remedy.”



Paracelsus (1493-1591)

“All substances are poisons. ÑÂ Ò' μζ\$β μù\$Ò' õÛØó×  
æØ×Ú.”

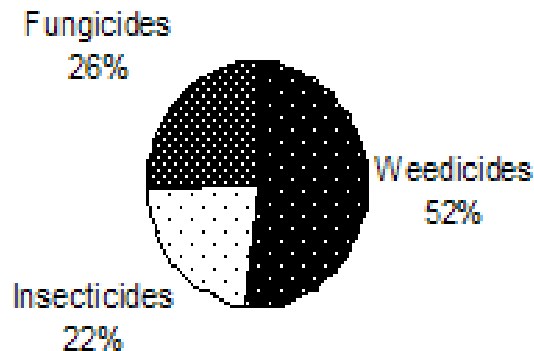
# Key Market Shares (2007)



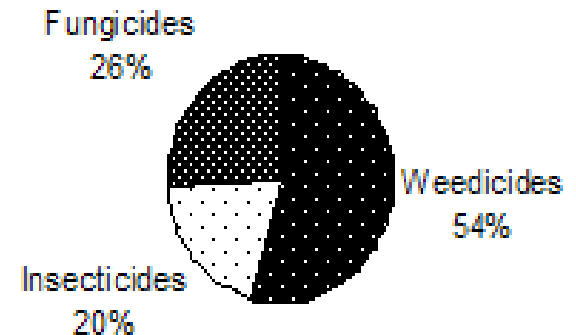
■ Presently major share on Weedicides >50%

■ >90% farmers rely on weedicides

Pesticide share (a.i.) 2000

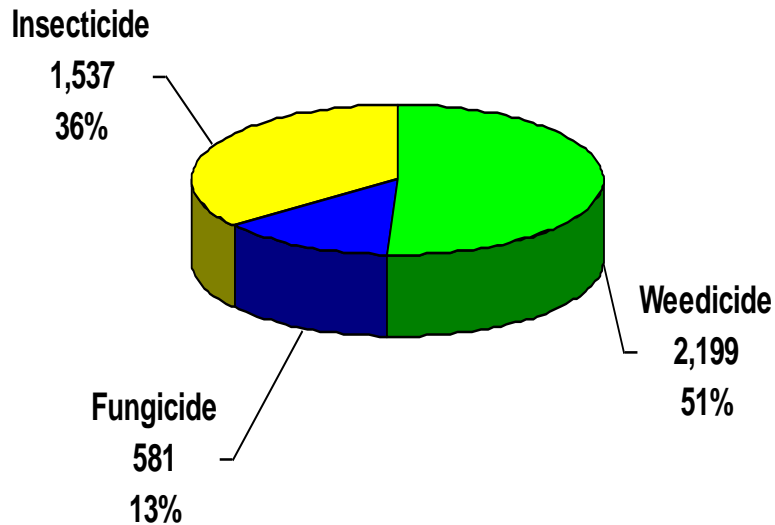


Pesticide share (a.i.) 2006

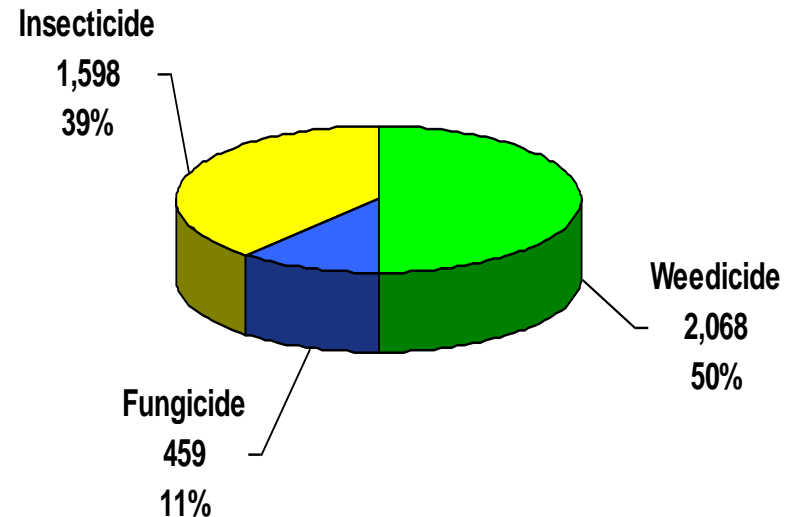


# Total Pesticide Market – Value (Rs. Mn)

Total Pesticide Market Value(Rs. Mn)  
2005/06

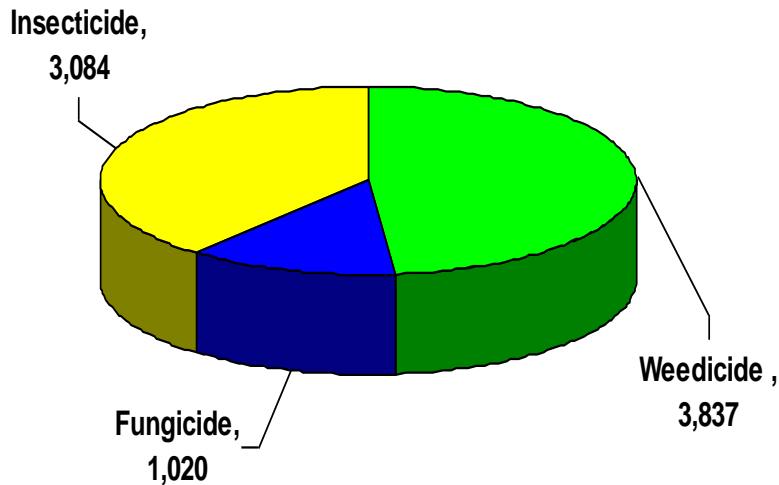


Total Pesticide Market Value (Rs. Mn)  
2006/07

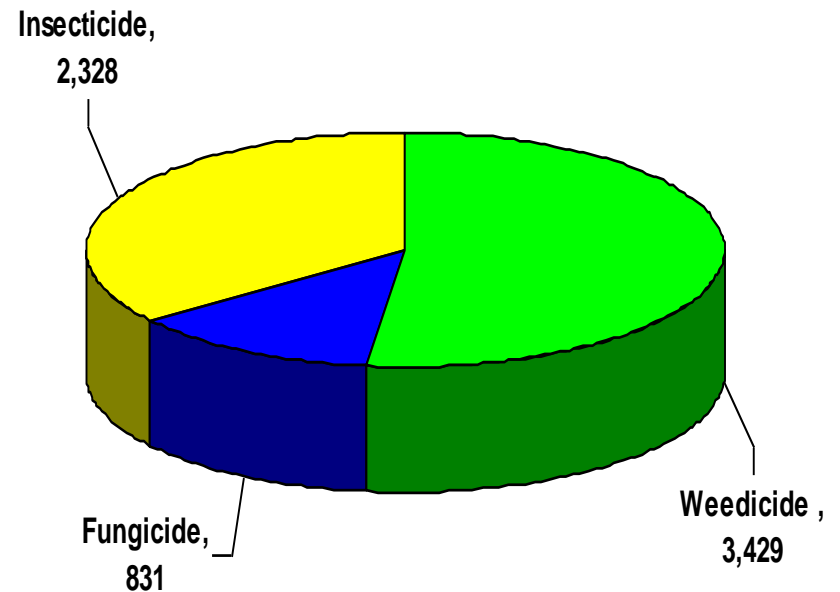


# Total Pesticide Market –Quantity (MT)

Total Pesticide Market Quantity (MT/KL)  
2005/06



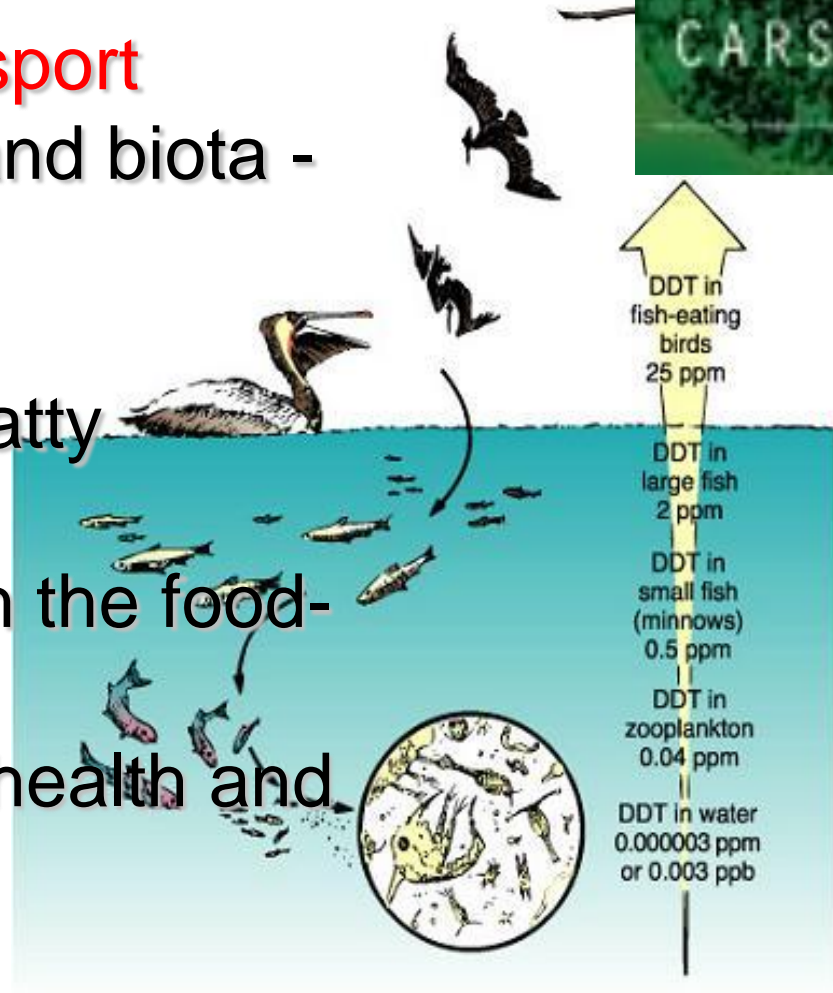
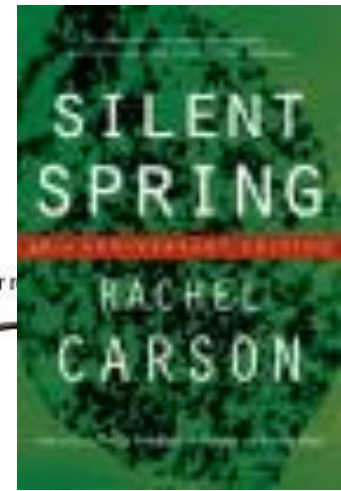
Total Pesticide Market Quantity (MT/KL)  
2006/07



# Environmental Movement...1970s

1. **Persist** for several years in the environment
2. **Environmental transport** through air, water, and biota - regional and global distribution
3. **Bio-accumulate** in fatty tissues
4. **Bio-magnify** through the food-chain
5. **Adverse effects** on health and the environment

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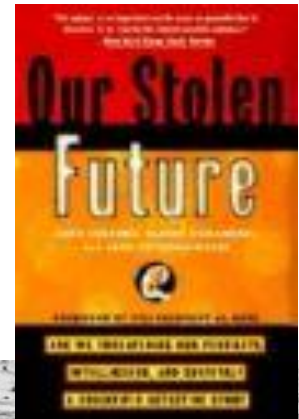
# Health Movement...1990s



By now with hydrocephalus in an area of Kerala is prayed with endorphins. The use of this pesticide has led to high rates of birth defects in this area? and really has been usually linked to pesticides. The child died shortly after this photo was taken.



The image shows the effects of pesticides on children in Kerala. The child is severely malnourished and has a severely enlarged head. This is a result of the use of pesticides in the area.



# Beginning of Pesticide Regulations in Sri Lanka

- Liberal import of pesticides up to 1962 October
- Import restrictions up to 5.23 million rupees by Revenue Controller in 1963
- Government committee to review pesticide list
- Draft “Act of Agricultural Pesticides” submitted to the Attorney General in 1964
- Government recognized the importance of a national body and implementation of the Law in early 1970’s
- FAO assisted to bring the “Control of Pesticides Act No. 33 of 1980” and declared effective on 5th September, 1980
- Full implementation in 1984





PARLIAMENT OF THE DEMOCRATIC  
SOCIALIST REPUBLIC OF  
SRI LANKA



...Parliament deems it expedient in the public interest for the Government to control pesticides including the import, packing, labeling, storage, formulation, transport, sale and use thereof: Be it enacted by the parliament of the Democratic Socialist Republic of Sri Lanka.

CONTROL OF PESTICIDES  
ACT, No. 33 OF 1980  
1980

Control of Pesticides Act No. 33 of 1980

and

Control of Pesticides (Amendment) Act No. 06 of 1994

and

Regulations made there under

TO BE  
Price: 90 cents

# Definition of Pest/Pesticide Cont.

■ Pest means any insect, rodent, nematode, fungus, weed or any other form of terrestrial or aquatic life or virus, or bacteria or other micro-organism **except** viruses, bacteria or other micro-organism on or in living man or other living animal.

■ Pesticide means (1) any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pests and (2) any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant.

FIFRA, June 25, 1947



# Definition of Pest/Pesticide

■ Pest means any insect, rodent, bird, fish, mollusc, nematode, fungus, weed, **micro-organism**, virus or other kind of plant or animal life which is injurious, troublesome or **undesirable to** crops, stored products, processed foods, wood, clothes, fabrics or **inanimate objects** or which are objectionable **from the view point of public health and hygiene**, and shall also include ectoparasites of man and domestic animals.

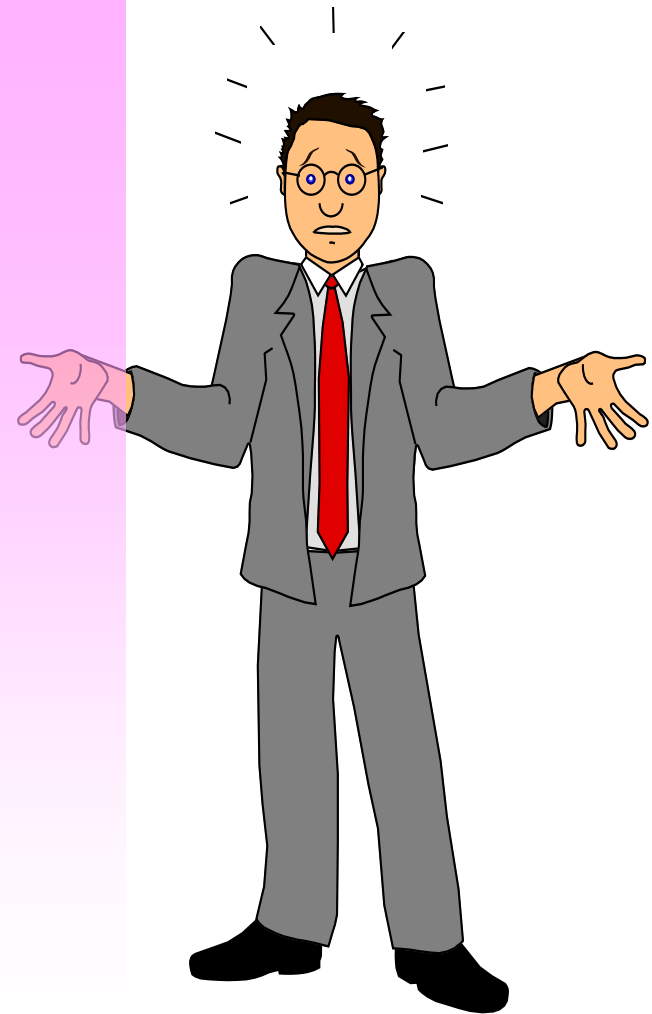
This is not an Act limited to agricultural pesticides!

# Main Functions of the Act

- Establishment of governing bodies
  - Registrar of Pesticides/Asst. Registrar(s) of Pesticides (Section 3)
  - Pesticides Technical and Advisory Committee (Section 4)
  - Responsibilities entrusted on Importers, Formulators, Traders and Users (Sections 14-20)
  - Field enforcement (Sections 21-22)
  - Penalty structure as a criminal offence (Section 24)

# Main Functions of the ROP

- Licensing of pesticides (Section 7)
  - 3 year full term
  - 1 year provisional permit
  - Re-registration
- Rejection of application (Section 7)
- Cancellation of licence/  
Provisional permit (Section 11)
  - Cancellation
  - Suspension
  - Modification
  - Withdrawal



# Pesticide Registration Process

## Major steps of the registration process

### Major Decision Making Criteria

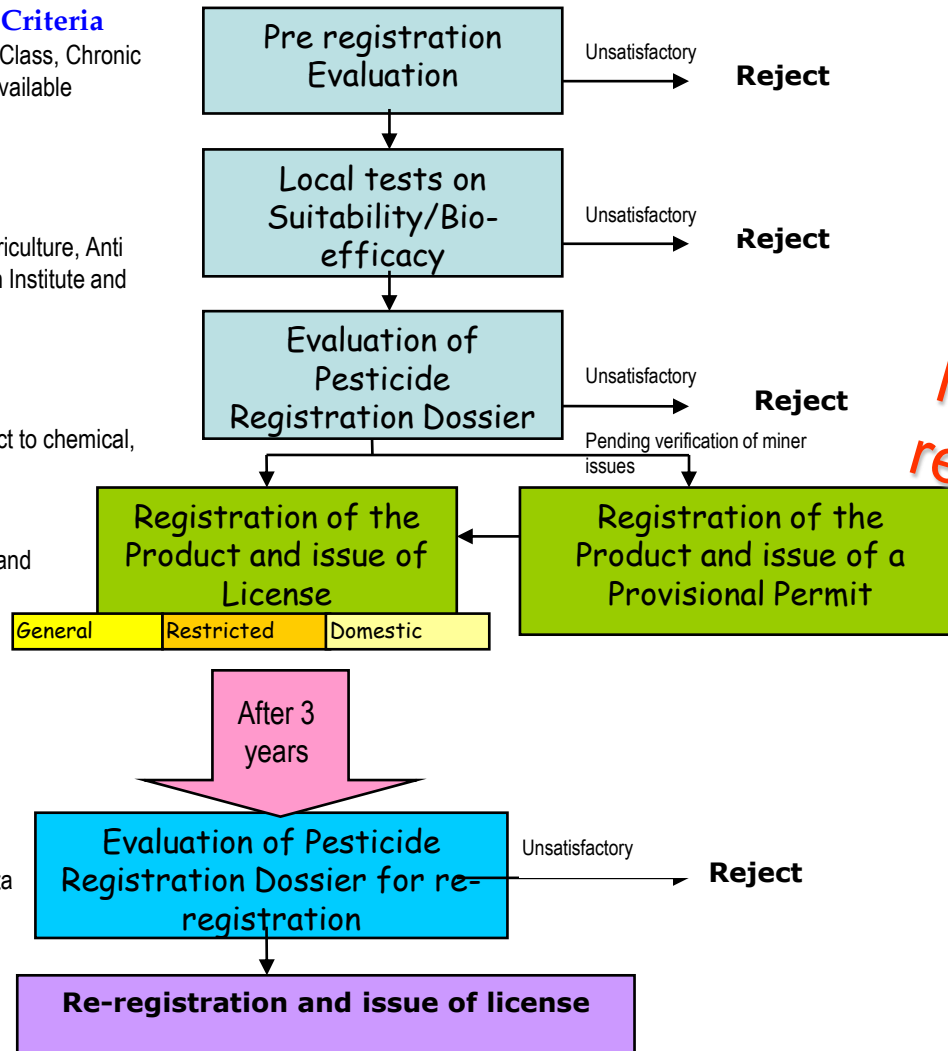
- National policies viz. WHO Haz. Class, Chronic health, residue and env. effects, available alternatives

- Local standards (eg. Dept. of Agriculture, Anti Malaria Campaign, crop Research Institute and Medical Research Institute etc)

- Risk/benefit analyses with respect to chemical, toxicological and env. effects

- Assignment of risk reduction measures according to the product and use profile

- Re-evaluation of the Risks and benefits according to the current data and knowledge



Each and every products are separately assessed... NO "me-too" registrations!

# Sections 14-20

## Command type

### ■ Shall not...

■ Manufacture, formulate, pack or distribute, sell, offer for sale or deliver within the country (Section 14)

■ Adulterated/decomposed/deteriorated pesticides (Section 15)

■ Close juxtaposition with foodstuffs (Section 16)

■ Import without prior approval (Section 17)

## Obligation type

### ■ Shall...

■ Advertise in accordance with labeling information (Section 18)

■ Store in a secure place (Section 19)

■ Harvest allowing PHIs (Section 20)

# Pesticide cancellations...

- ...Registrar considers it necessary in the interest of the public to do so...on the advice of the Committee...cancel, suspend, or modify...(Section 11)

- ...pesticide formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment. **Progressive ban on highly hazardous pesticides endorsed at the 131<sup>st</sup> Session of the FAO Council (November, 2006)**

- **Gradual phase out of paraquat, dimethoate and fenthion over 3 years starting from 2008 is in effect.**



# Types of pesticides

## ■ General pesticides

- All agricultural pesticides

- Can be sold only in authorized pesticide outlets (Act No. 06 of 1994)

## ■ Domestic pesticides

- Can be sold without a licence

- Low strength pesticides

## ■ Restricted pesticides

- Highly hazardous products

- Use or distribution restrictions will apply

- Require trained applicators under strict supervision

- (most) Not in retail market

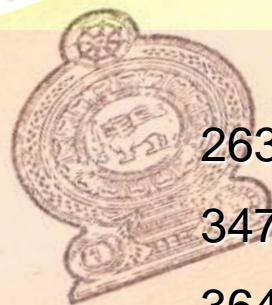
# Impose Regulations (Section 26)

## ■ Current regulations

1. Fee structure 263/17 (1983)
2. Labeling information 347/7 (1985)
3. List of approved pesticides 364/19 (1985)
4. Pre-harvest Intervals/MRLs 1254/8 (2002)
5. Manner of sale of pesticides 433/9 (1986)
6. List of banned pesticides 1113/15 (2000)
7. Authorized analyst 1190/24 (2001)
8. Authorized analyst 1293/21 (2003)

## ■ Pending regulations...

1. Pest control services ? (2009)
2. Labeling information ? (2009)
3. Trainings for pesticide applicators ? (2009)
4. Penalty structure ? (2009)



PARLIAMENT OF THE DEMOCRATIC  
SOCIALIST REPUBLIC OF  
SRI LANKA

CONTROL OF PESTICIDES  
(AMENDMENT)  
ACT, NO. 15 OF 1994

Printed on the Order of Government  
Certified on 6th April, 1994

Printed to Part II of the Gazette of the Democratic  
of Sri Lanka of 8th April, 1994  
PRINTING, SRI LANKA  
AU, COLO

# Do we need pesticides?

- No one is talking about getting rid of all pesticides tomorrow morning!
- Using pesticides creates as many problems as it solves! (e.g. secondary pests, susceptibility to pests or diseases)
- A lot more pesticides are used now, and crop damage has not decreased!
- Reports claims that cutting 50% of pesticide use today would cause no decrease in crop production!
- Pesticide ban during last two decades caused no decrease in crop production!

# Definitions- Target classifications



Pesticide = Killer of pests

What do each of these pesticides kill?

insecticide, herbicide, fungicide, miticide,  
rodenticide, molluscicide, nematocide,  
bacteriacide, piscicide

# Pesticide nomenclature

- **Neonicotinoids**- Pesticide family
- **Actara** -Brand (trade) name-



- **Thiamethoxam** -ISO approved common name -
- **25 WG** - Formulation abbreviation
  - 25% water dispersible granules by weight

# Broad comparison of pesticide toxicity

**Insecticides**



**Herbicides**



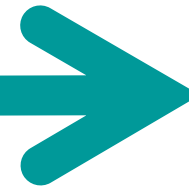
**Fungicides**



**Fumigants**



**Rodenticides**



0 1 2 3 4 5

LOG<sub>10</sub>

Oral LD<sub>50</sub>

HIGHER LD<sub>50</sub>/LC<sub>50</sub> => less toxic



LOWER LD<sub>50</sub>/LC<sub>50</sub> => more toxic



# One of the risk management tools

**புரட்சி:** மென் டென்சைன் அளவுகளை மீறியது காரணமாக உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **செலிபைட்:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **புரட்சி:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **செலிபைட்:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **புரட்சி:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **செலிபைட்:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது.

**முதலாவது நபர்:** நபர் உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **செலிபைட்:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **புரட்சி:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **செலிபைட்:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது. **புரட்சி:** உடலுக்கு எந்தவித பாதிப்பும் ஏற்படாது.

**First aid measures - Follow the instructions given below and obtain medical attention immediately.**  
**Eye contact:** Irrigate with eyewash solution or clean water, holding the eyelids apart, Slowly and gently for at least 15-20 minutes **Skin Contact:** Remove contaminated clothing. Wash skin immediately with soap and water for 15-20 minutes. If skin irritation or sensitization persists, obtain medical attention immediately. **Inhalation:** Remove patient from exposure, keep warm and rest. If person is not breathing, give artificial respiration, preferably mouth-to-mouth if possible. **Ingestion:** If person is conscious, induce vomiting by sticking finger down throat. If swallowed in large quantities, repeatedly administering activated charcoal in a large quantity of water is indicated. Do not give anything by mouth to an unconscious patient. **Medical advice:** No specific antidote. Symptomatic treatment.

In case of emergency of poisoning, call 011-2686143 or 011-2691111 Extension 430 NATIONAL POISON INFORMATION CENTRE

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**பாதுகாப்பு ஆலோசனை:** சிறுவர்கள், விட்டுப் பிராணிகள், உணவுகள் மற்றும் உணவுப் பதார்த்தங்கள், நீர் விநியோகங்கள் ஆகியவற்றுக்கு எட்டத்தில், பாதுகாப்பான இடத்தில் சாவி போட்டு முடிவைக்கவும். **விழும்பினால்,** சருமத்தின் ஊடாக உறிஞ்சப்பட்டால், அல்லது உட்கவாசித்தால் ஆபத்தானதாகலாம். தூளை அல்லது விசிறல் தூளை உட்கவாசிக்க வேண்டாம். செறிவைக்க கையாளும் போதும், விசிறும் போதும் இறப்பர் கையுறைகளையும், இறப்பர் காலணிகளையும், உட்கவாசிக்கும் கருவிகளையும் அல்லது முழுமையான முகமூடிகளையும், நீண்ட கையிலான மேலங்கிகளையும், மற்றும் வேறு பாதுகாப்பு ஆடைகளையும் அணியவும். வேலை செய்யும்போது, சாப்பிட, குடிக்க, அல்லது புகைக்க வேண்டாம். **கையாண்ட பின்னர்** சவர்க்காரும், நீரும் கொண்டு உடலை நன்கு கழுவவும். மீள உபயோகிக்கும் முன்னர் மாசடைந்த ஆடைகளைச் சலவை செய்யவும். **நீர்வாழ் அங்கிகளுக்கு** ஆபத்தானது. நீருக்கு நேரடியாகப் பிரயோகிக்க வேண்டாம். தேவையற்ற பிரயோகங்கள், வழிதல் பொருட்கள், சாதனங்களை ஒழித்தல், கழுவும் நீர் அல்லது அலசல் ஆகியவற்றினால் நீர் மூலங்களை மாசடையச் செய்ய வேண்டாம். வெற்றுக் கொள்கலன்களை ஒழிக்கவும். **விபத்தைப்** பொறுத்தளவில் அல்லது நீங்கள் சுகவீனமுற்றால் உடனடியாக மருத்துவ ஆலோசனையை நாடுங்கள். (லேபலையும், கொள்கலனையும் காட்டுங்கள்)

**Safety advices:** **Keep out of reach of children, domestic animals, food and foodstuffs and water supplies in a secure place under lock and key.** **Harmful if swallowed, absorbed through skin or inhaled, Avoid contact with skin, eyes and clothing. Do not inhale spray mist.** Wear rubber gloves, rubber boots, respirators or complete face masks, long-sleeved overalls and other protective clothing when handling the concentrate and spraying. Do not eat, drink or smoke at the work place. **Wash body thoroughly with soap and water after handling.** Wash contaminated clothing before re-use **Harmful to aquatic organisms. Do not apply directly to water. Do not contaminate water sources by unnecessary applications, spilled materials & disposing of equipment wash-water or rinsate. Destroy empty containers.** **In case of accident or if you feel unwell, seek medical advise immediately (Show the label and container)**

# World Health Organization (WHO) Classification of Pesticides by Hazard

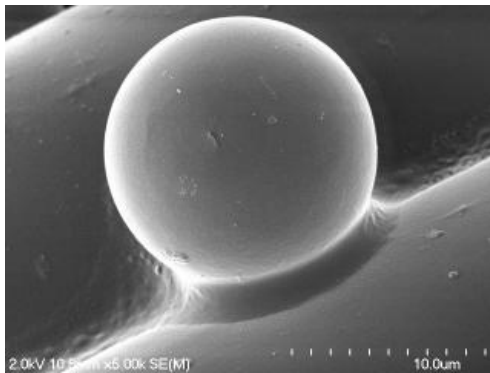
Class	LD <sub>50</sub> for the rat (mg/kg body weight)			
	Oral		Dermal	
	Solids	Liquids	Solids	Liquids
<b>Ia</b> Extremely hazardous	5 or less	20 or less	10 or less	40 or less
<b>Ib</b> Highly hazardous	5 - 50	20 - 200	10 - 100	40 - 400
<b>II</b> Moderately hazardous	50 - 500	200 - 2000	100 - 1000	400 - 4000
<b>III</b> Slightly Hazardous	Over 500	Over 2000	Over 1000	Over 4000
<b>IV</b> Unlikely to present acute hazards	Over 2000	Over 3000		



# Novel approaches in pesticide products



Insecticide treated bed  
nets...chemicals embedded in polymer  
capsules for last long even for 20  
washings!

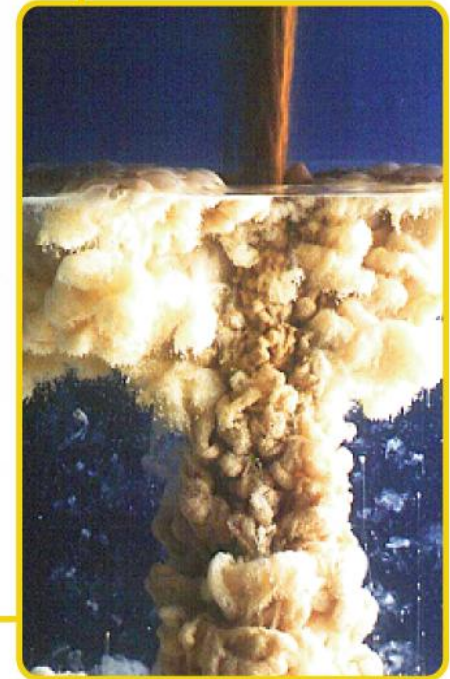
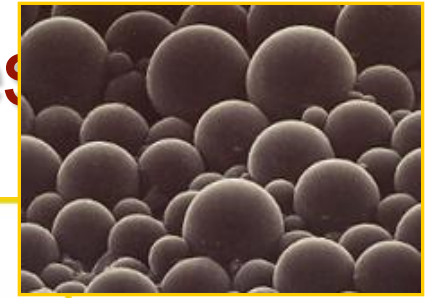
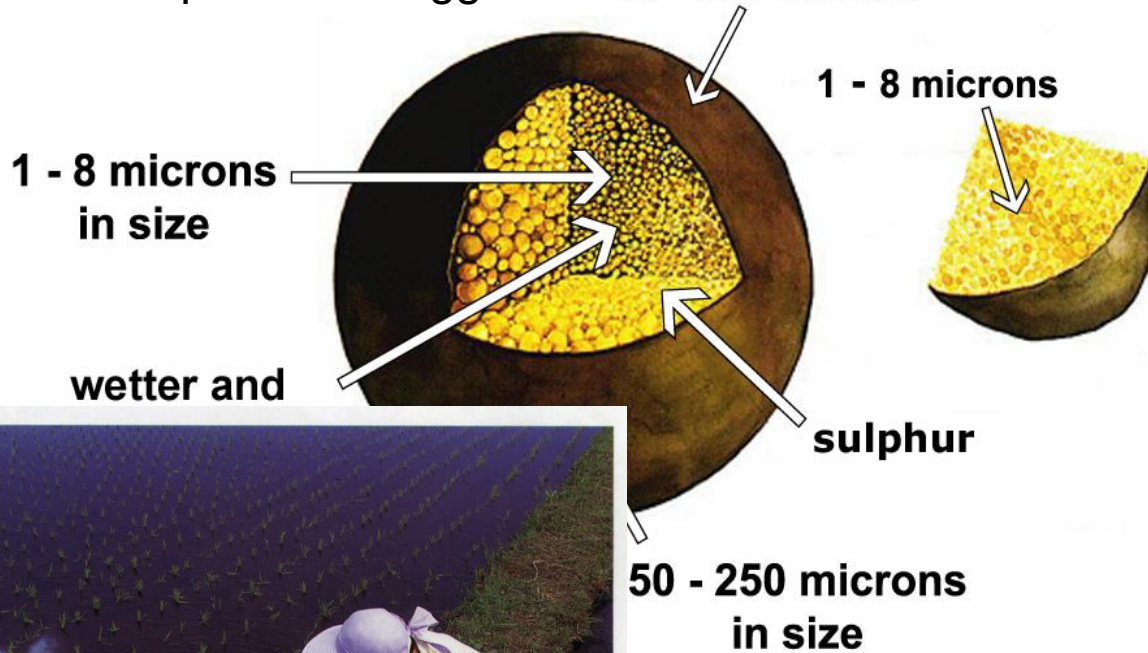


SplashPack  
...keeps sprayers  
away thus minimizing  
exposure

■ Solnet® Pretilachlor

# Latest formulation technologies

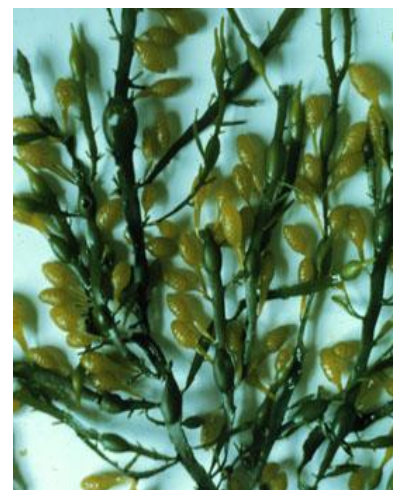
## ■ Microencapsulated Trigger® C50 - 250 microns



**THIOVIT® Jet dissolves immediately upon contact with water and maintains excellent dispersion and suspension.**

# Most of a pesticide product is formulants

- On average, formulants make up 32 % of a pesticide product.
- The level of formulants can go up to 99 % or more in domestic products (the ones consumers can buy).



# Where we stand?

## ■ Pesticide regulators...

When ever a pesticide is approved for use...

## ■ Pesticide industry...

If the product is used according to labeled directions, both people's health and environment will not be harmed...

## ■ Pesticide consumer...?



# Consumer attitude...!

- Majority were not using the recommended dosage (70%)
- Majority had symptoms of acute toxicity following spraying (82%)
- About 20% have undergone at least one hospital admission
- Inadequate protective measures while spraying



# Issues surrounding pesticides

- Personal safety

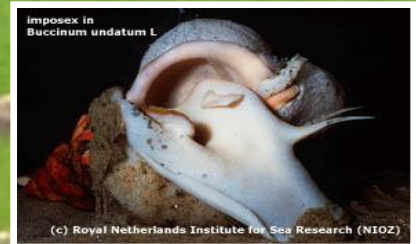
Occupational/intentional

- Impact on environment

- Impact on beneficial insects

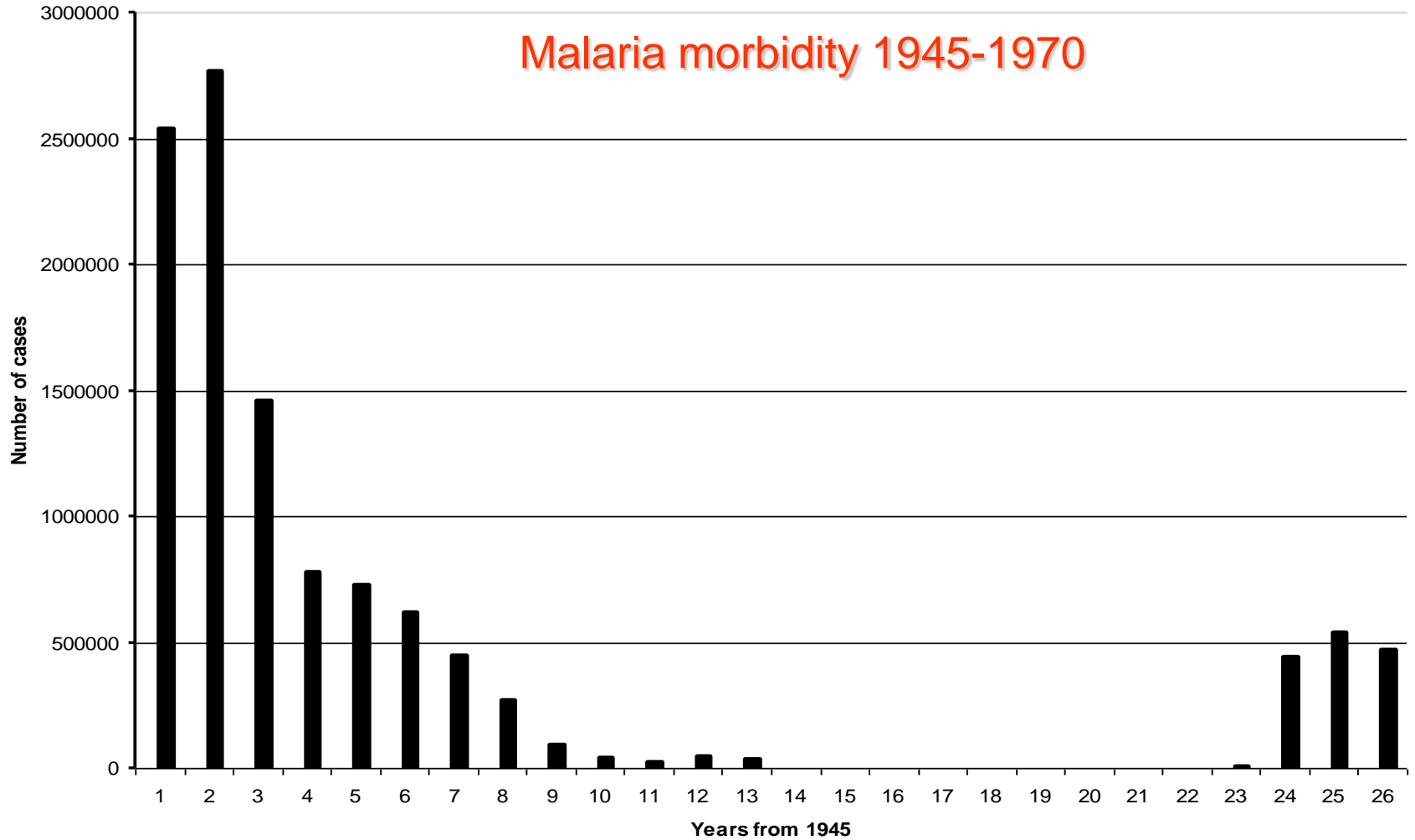
- Pesticide resistance

Rotate mode of action to reduce resistance

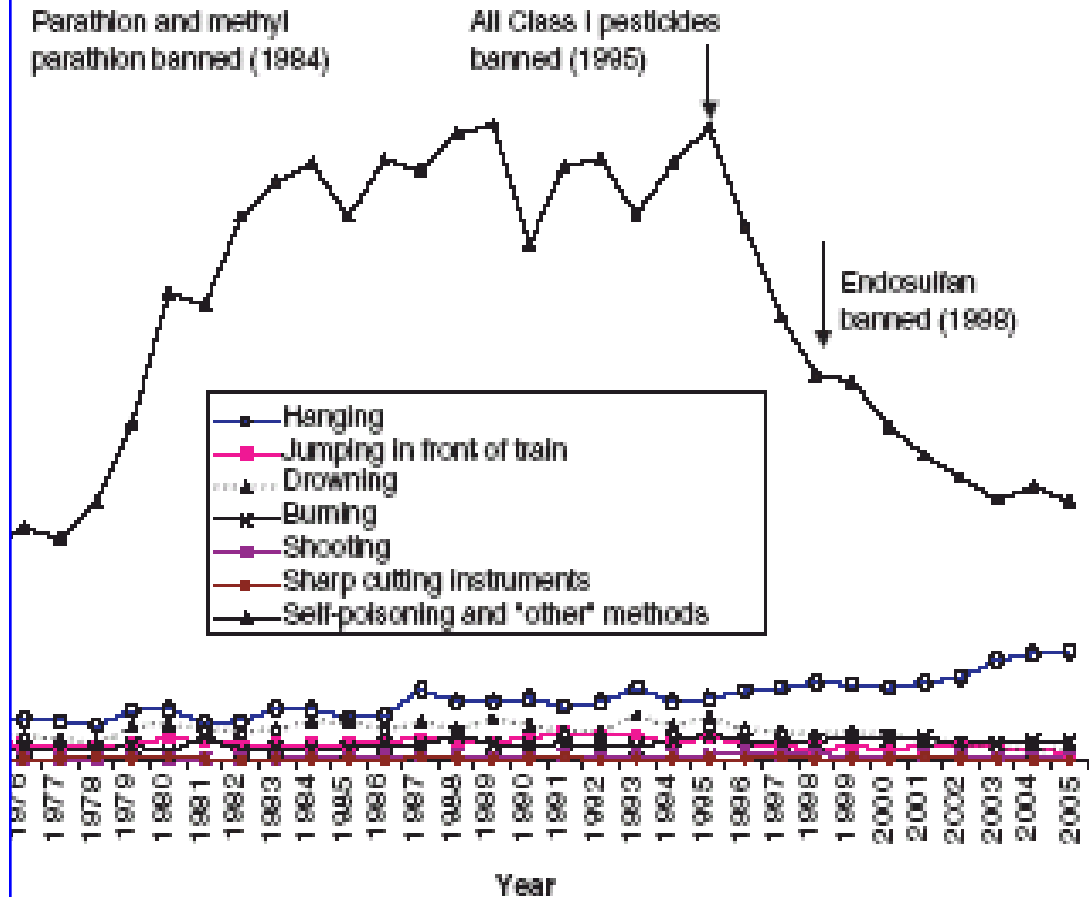
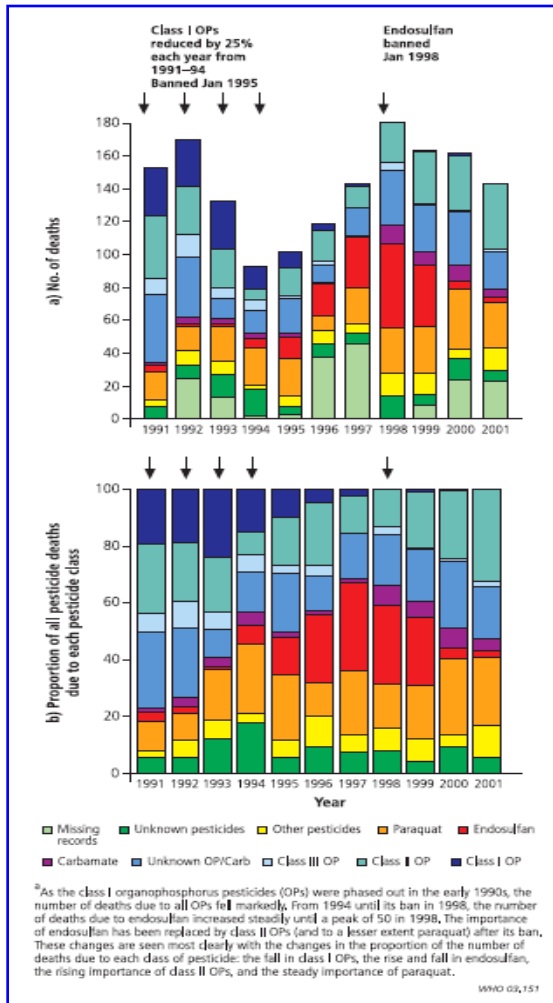


Could this be prevented by the Law?

# Pesticides saved millions of lives...



# Pesticide restriction saved thousands of lives...



Gunnell et al., (2007); Roberts et al., (2003)



## Present challenges...

...investigation of possible use of ethylene oxide which is a known human carcinogen (IARC, 1994);

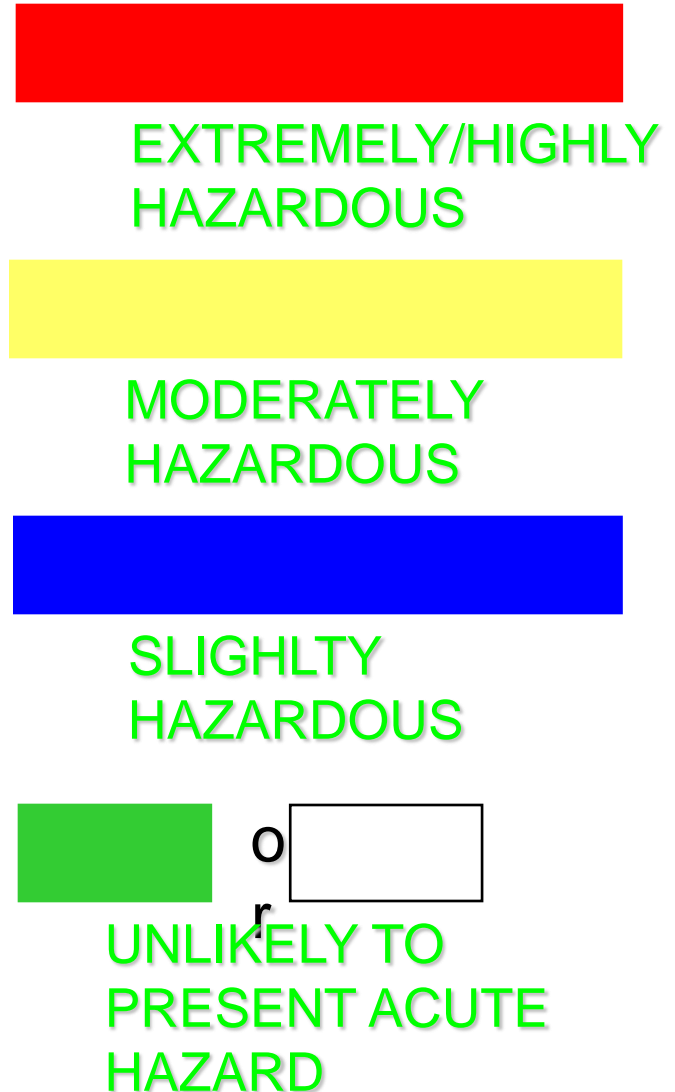
**Opportunity to risk assessment...**

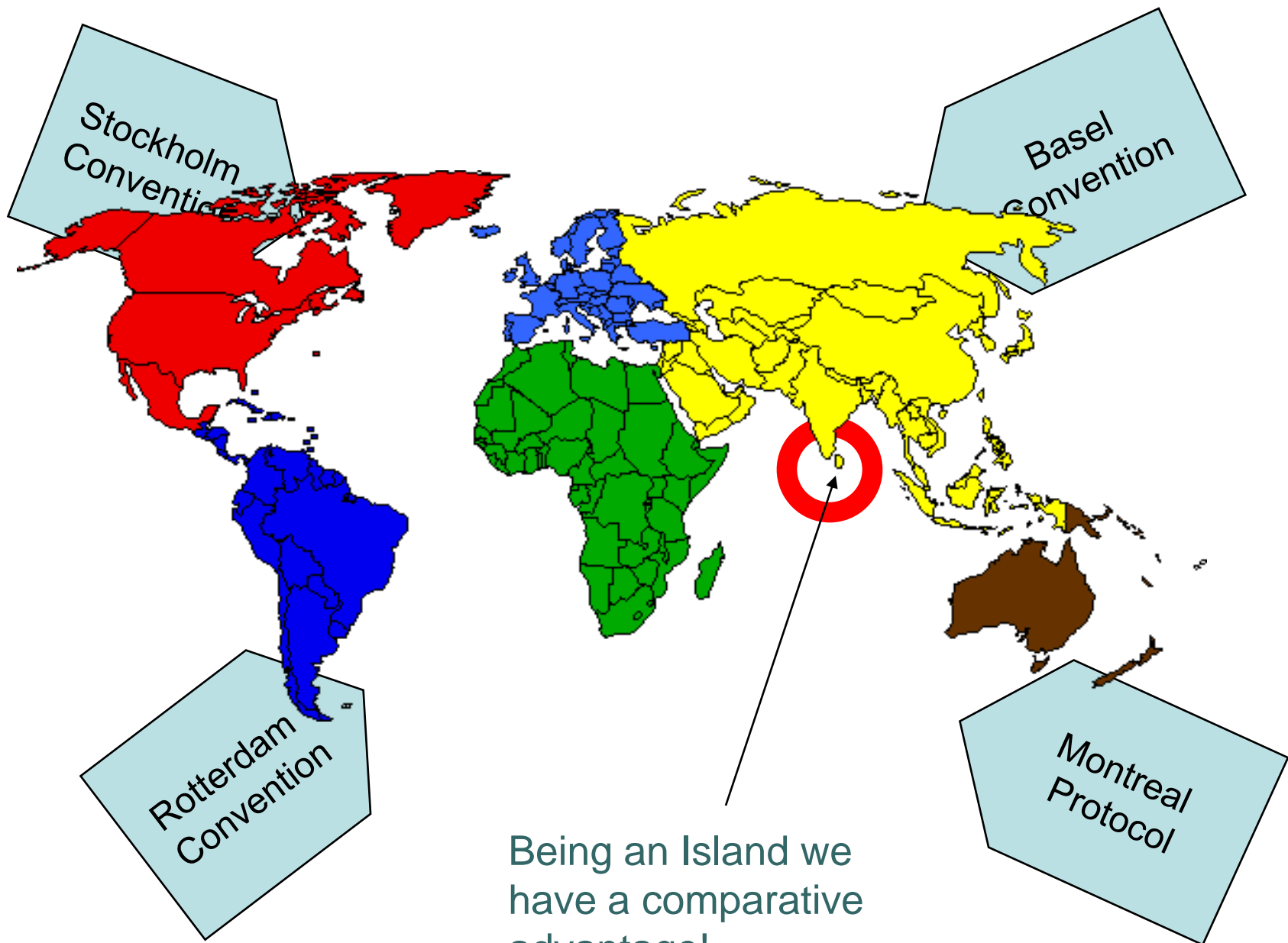
“The pesticide definition covers sterilization of medical devices though it is not an agricultural application”.

# Responses to issues...

- Vary in toxicity and modes of action
- Vary in effects on non-targets
- Vary in longevity
- Vary in compatibility with biological control and other non-targets

Most effective long term use is to choose the **least toxic material** needed to get the job done





Stockholm  
Convention

Basel  
Convention

Rotterdam  
Convention

Montreal  
Protocol

Being an Island we  
have a comparative  
advantage!



Convention aims to protect human health and the environment from the effects of persistent organic pollutants (POPs) with a range of control measures to reduce and, where feasible, eliminate POPs releases, including emissions of unintentionally produced POPs such as dioxins. The Convention also aims to ensure the sound management of stockpiles and wastes that contain POPs.

**Sri Lanka became a signatory on 5<sup>th</sup> September 2001.**

### **POPs listed in Annexes to the Stockholm Convention**

Aldrin

Heptachlor

Polychlorinated biphenyls (PCB)

Chlordane

Hexachlorobenzene (HCB)

DDT

Dieldrin

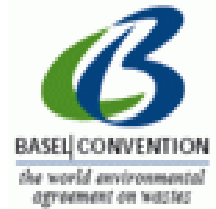
Mirex

Dioxins

Endrin

Toxaphene

Furans



The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental agreement on hazardous and other wastes. The Convention has 172 Parties and aims to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes. The Basel Convention came into force in 1992.

**Sri Lanka became a signatory on 29th January 1999**



# ROTTERDAM CONVENTION

Share Responsibility



**Rotterdam Convention enters into force  
Treaty provides a first line of defense against hazardous chemicals and pesticides**

**24 February 2004, Rome/Geneva -- The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade becomes international law and thus legally binding on its members today.**

**Sri Lanka became a signatory on 19<sup>th</sup> January 2006**

**DDT**

**Dieldrin**

**Dinitro-ortho-cresol (DNOC)** and its salts

**Dinoseb** and its salts and esters

**1,2-dibromoethane (EDB)**

**Ethylene dichloride**

**Ethylene oxide**

**Fluoroacetamide**

**Hexachlorocyclohexane (mixed isomers)**

**Heptachlor**

# Unwanted Un-intentional

■ 2,4,5-T+2,4-D  
(AgentOrange®)

■ Earlier formulations  
of 2,4-D



# Unwanted Intentional...

## ■ “Inert”

polyethoxylated  
tallowamine (POEA) in  
glyphosate  
formulations has  
amplified the toxic  
effect on human-  
embryonic, placental  
and umbilical cells...!





“Chlorinated hydrocarbons are still being used as pesticides in agriculture and industry...especially in areas such as Nuwara Eliya, where there is massive use of pesticides in vegetable cultivation, the probability of streams and rivers being polluted with hydrocarbons is high.”

Ref.

Save the otter? We sure ought'a! Nature, September 1999. p. 27-29 by Padma K. de Silva, Department of Zoology, University of Peradeniya, Peradeniya.

“The importation, formulation and distribution of agrochemicals are controlled by the private trade whose leading firms collaborate with multinational corporations or are the latter’s subsidiaries. Many of these are thus powerful enough to have found a market in Sri Lanka, as in the Third World generally. They have sold pesticide products, which are banned in developed countries. In Sri Lanka, before the recent import licensing, seven of the “Dirty Dozen”, though officially prohibited were available in the local market added Dr. S.B.D. de Silva.”

Ref.

Pesticides can cause greater harm to environment than fertilizers-Agricultural Economist. Island 30/08/1993 by L.B. Wijayasiri, Kandy Correspondent.

“Sri Lanka has been identified as a country which allowed import and use of DDT, aldrin, dieldrin, chlordane ... (WWF, 1999).”

Ref.

In Persistent Organic Pollutants: Hand-me-down poisons that threaten wildlife and people. January 1999. Issue Brief, World Wildlife Fund, Washington, D.C. p. 15.

“The World Health Organization is currently translating the objectives in “The action plan for the reduction of reliance on DDT for public health purposes” into detailed work plans, which also affects Sri Lanka as a major user of this notoriously toxic pesticide....Sri Lanka and 15 other developing nations legally use dichlorodiphenyltrichloroethane on crops and to effectively control Malaria, but which disrupts the working of human hormones, interfering with reproduction and the functioning of the immune system.”

## **Ref.**

WHO works on action plan on DDT use which also affects Sri Lanka. Daily News 28/09/1999. Quote Colombo, September 26 (Lanka Puwath).



thank

YOU !!!