

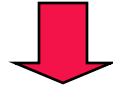
Development of the Pesticide Industry

Dhammika Rupasinghe
Chairman
CropLife - Sri Lanka



Green Revolution

1950 - Scientists introduced improved varieties, synthetic fertilizers, pesticides & irrigation methods.



To increase the world food production

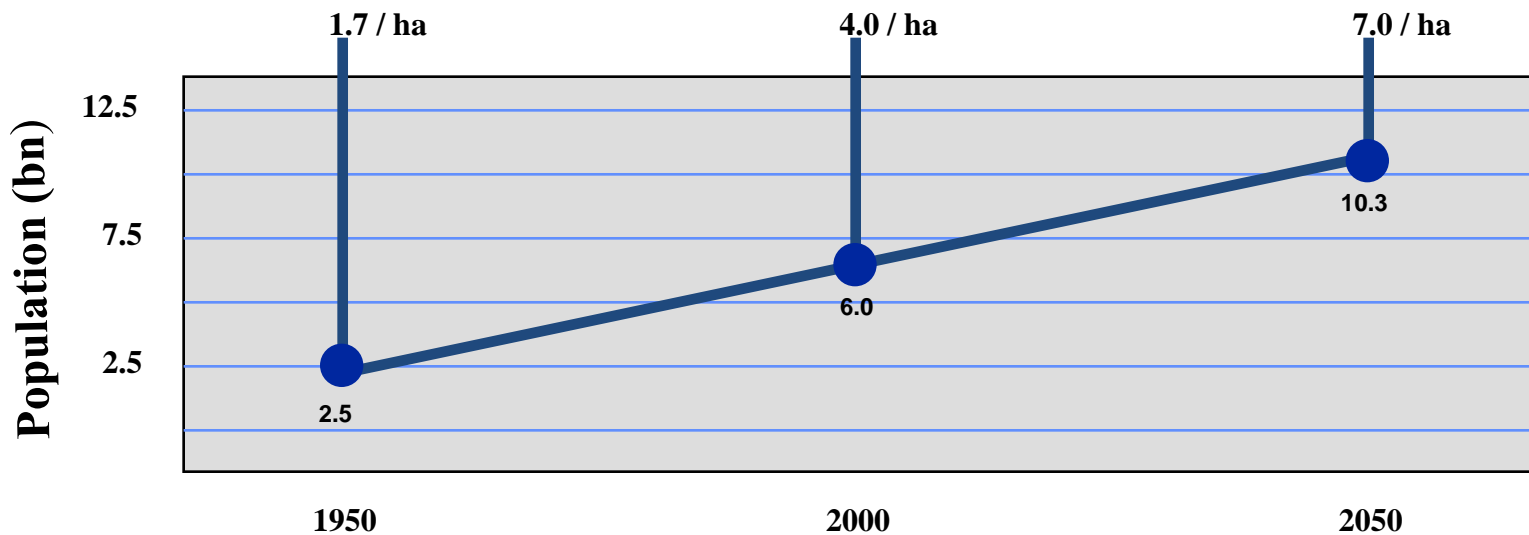
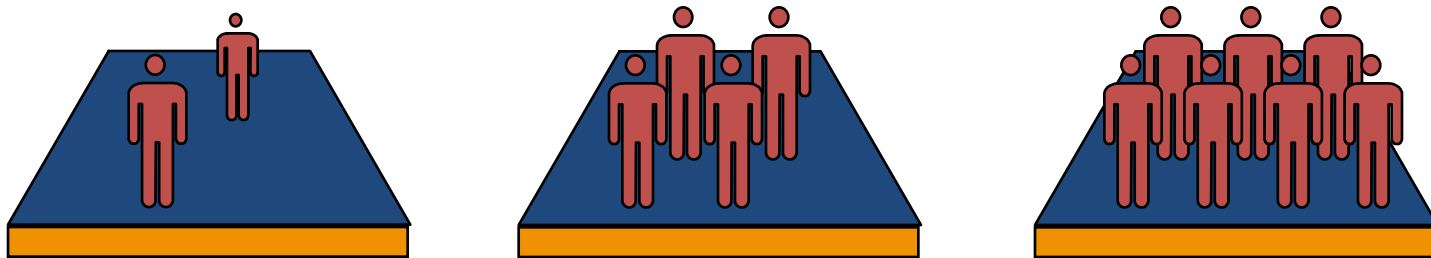


Pesticides

- A pesticide is any ***natural or man-made substance*** used to control unwanted pests (insects, weeds, fungi, etc..)
- Usage of pesticides
 - crop protection to increase yield and control pests
 - to protect your home, lawn and landscapes (termites, grubs, beetles, poison ivy, etc..)
 - hygiene and public health (cock roaches, fire ants, mosquitoes, fleas, ticks, rodents, etc..)
 - animal health (fleas, ticks, flies, etc..)
- Innovation in pesticide development is focused on maximizing potential benefits and minimize potential risks.

One hectare (2.5 acres) of arable land must feed a rising number of people

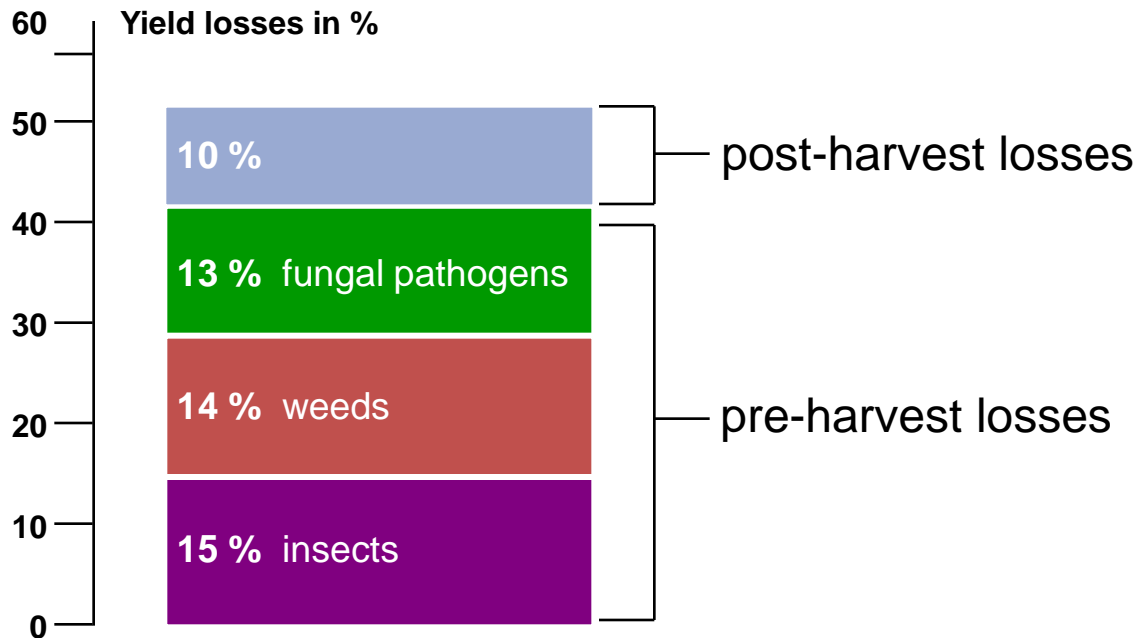
(Amount of arable land is constant at approximately 1.5 bn ha)



The world population is constantly increasing

50% of harvest lost without Crop Protection

▶ Average Destruction of non-treated Crops out of total attainable Production



Major crops analyzed:

Rice, wheat, barley, corn, potatoes, soybeans, cotton and coffee*

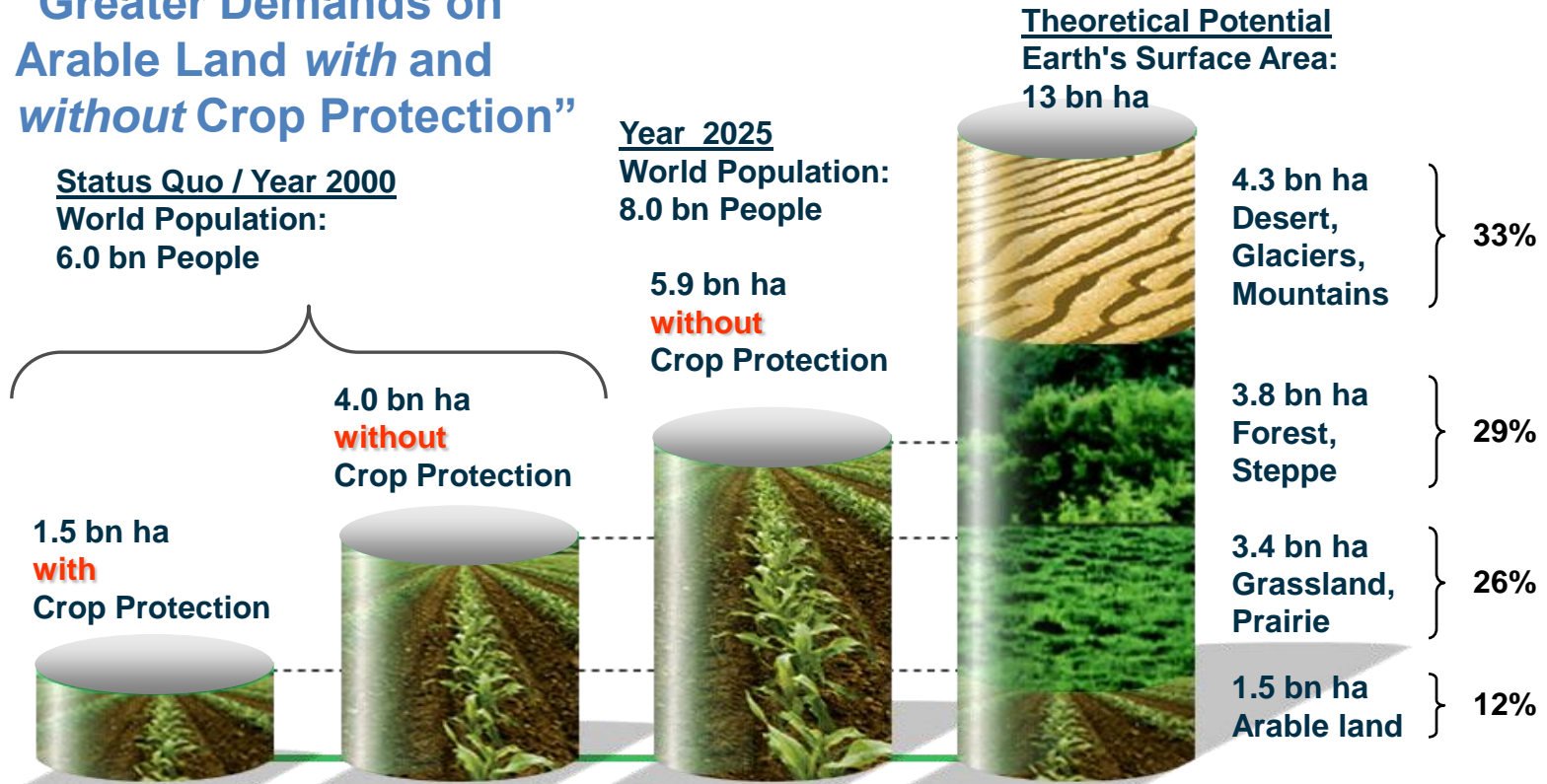
* approx. 50 % of crop area worldwide

Source: Oerke et al., 1995 / Yudelman et al., 1998

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Agricultural Area Required to Produce Global Food Supply With & Without Crop Protection

“Greater Demands on Arable Land *with* and *without* Crop Protection”

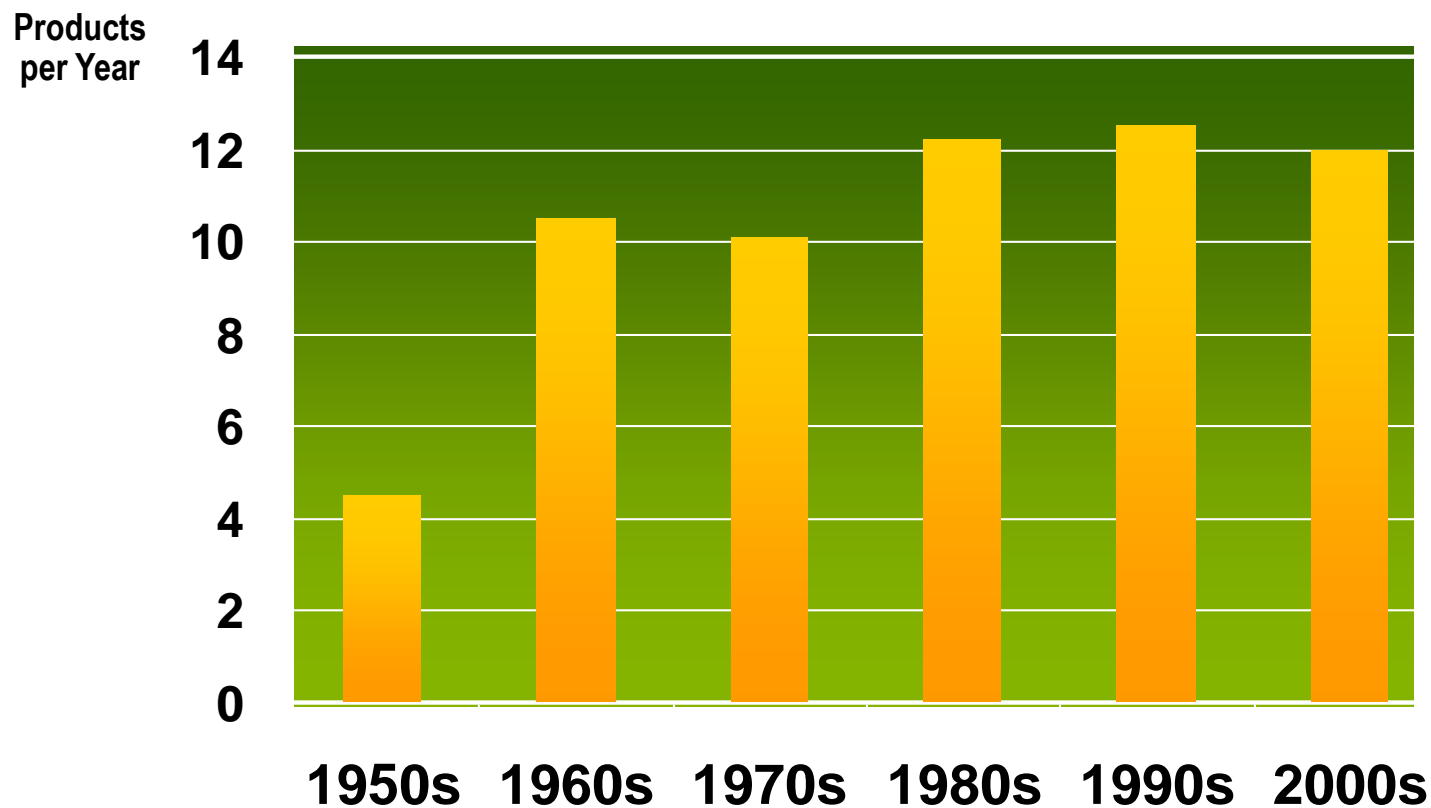


Source: D.T. Avery, US-Hudson Institute - FAO

1 Hectare (ha) = 10 000 m²

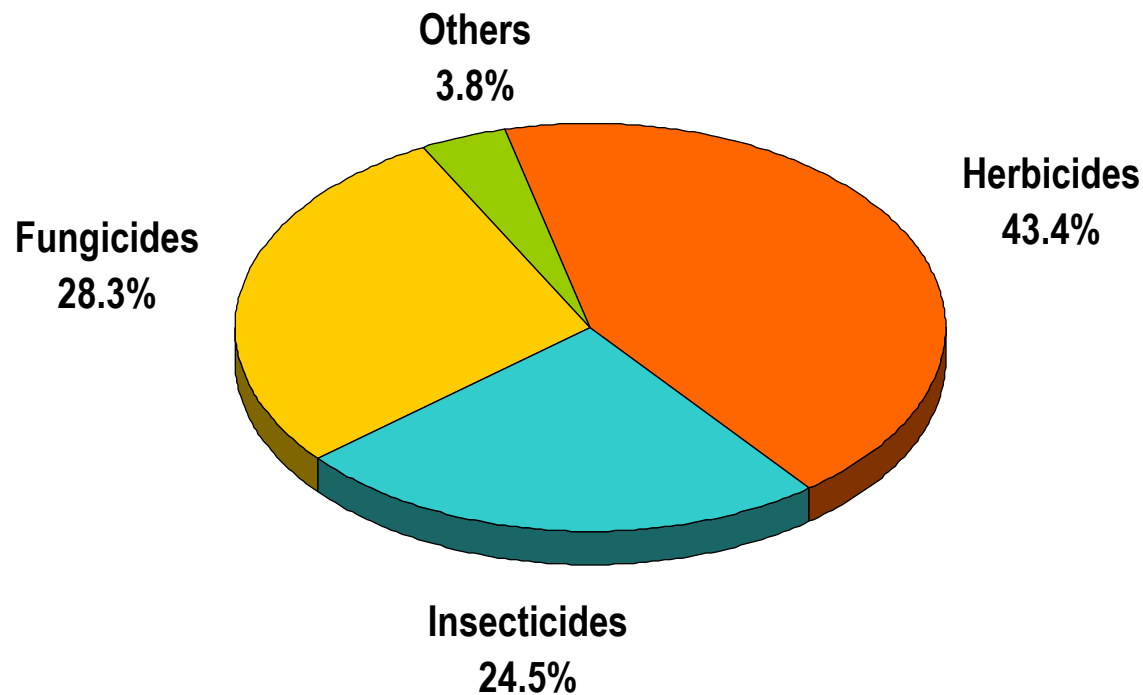
Research & Development in Crop Protection Chemistry

Average rate of new product introduction



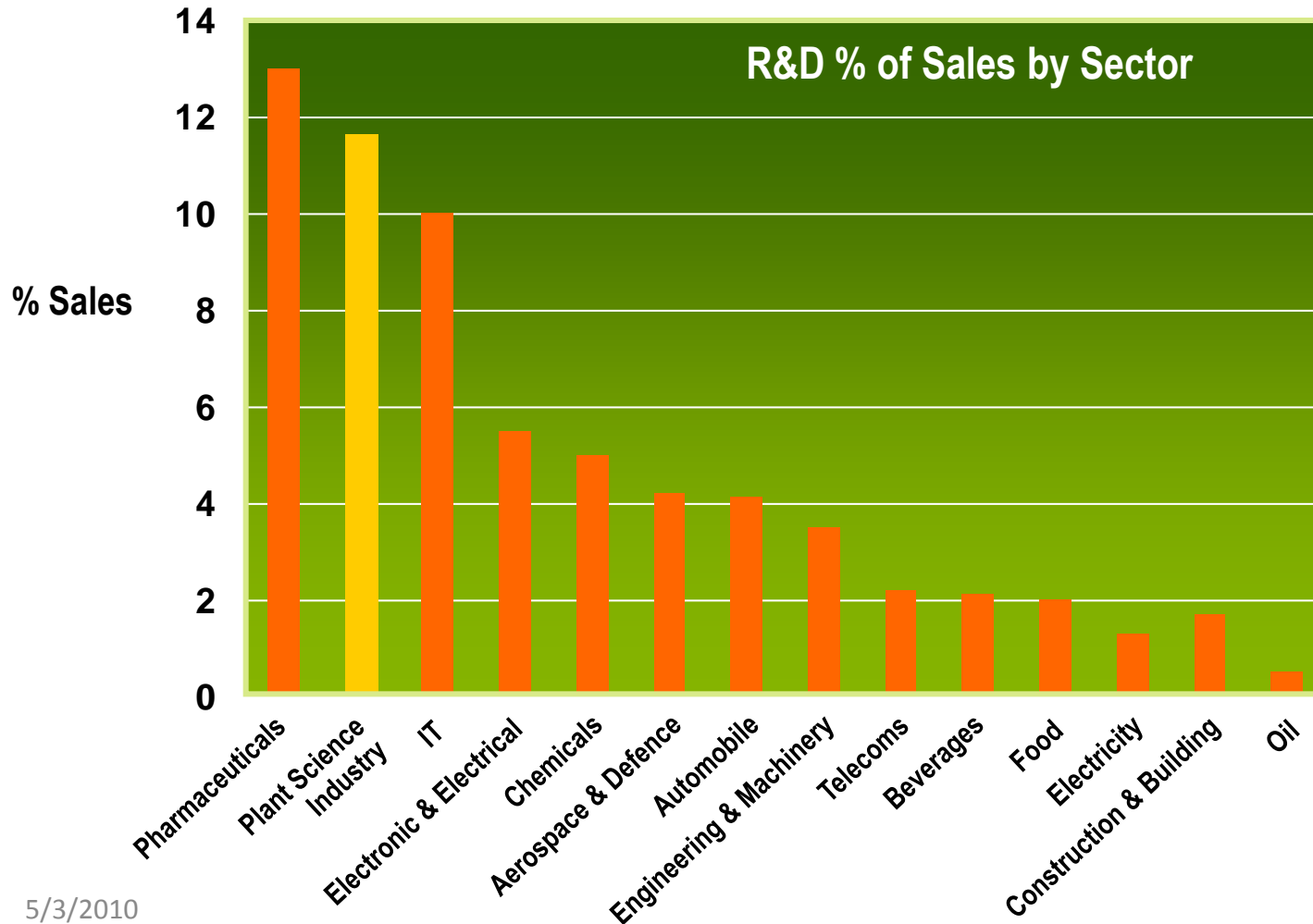
Research & Development in Crop Protection Chemistry

Products introduced since 1980 by type = 286



Research and Development

Plant Science Industry - A Research-Intensive Sector



Discovery and Development Cost of a New Crop Protection Product

Category	Sub Category	Cost (Euro m.)
Research	Chemistry	44
	Biology	48
	toxicology/Environmental	10
Research total	Chemistry	102
Development	Chemistry	22
	Field Trials	27
	Toxicology	20
	Environmental Chemistry	17
Developmental total		86
Registration		12
Total		200




Source: Phillips McDougall

Important Product properties

1. Physico – Chemical Properties of Active Ingredient /Technical / Formulation
2. Product fate in the environment – Soil , water, crops
3. Toxicological Impact of Pesticide on Biological Systems
 - Effect on Beneficial insects, Bees , Aquatic Organisms (fish, algae), Earth worms, Birds etc.,
4. Toxicological Test Reports on
 - a) Acute Toxicity (oral, dermal, inhalation, eye)
 - b) Sub Chronic & Long Term Toxicity
(Mutagenecity , Oncogenecity , Reproductive Toxicity, Teratogenecity)
 - c) Acceptable Daily Intake (ADI)
No Observable Effect Level (NOEL)
Maximum Residue Level (MRL)

R&D in Crop Protection Chemistry

Output

- Better chemicals with improved safety profile 
- Better formulations with reduced risk 
- Better packaging and improved container management 
- Application technology

Better chemicals with improved safety profile

- Target Specific pesticides
- Low application rates
- Insect growth Regulators (IGR)
(Chitin Synthesis Inhibitors)
- Moulting Accelerating Compounds (MAC)



Better formulations with reduced risk

- Less toxic



- Slow release

Eg. Micro Encapsulated formulations

- Unattractive granules

- Soil incorporated



WHO Classification of pesticides

		LD50 for rats (mg/kg body weight)			
		Oral		Dermal	
Classification	Class	Solids	Liquids	Solids	Liquids
Extremely hazardous	I a	5 or less	20 or less	10 or less	40 or less
Highly hazardous	I b	5-50	20-200	10-100	40-400
Moderately hazardous	II	50-500	200-2000	100-1000	400-4000
Slightly hazardous	III	Over 500	Over 2000	Over 1000	Over 4000
Unlike to present Acute Hazards	IV	Over 2000	Over 3000		



Better packaging and improved container management

- ISO certification for repackaging
(ISO 9001 , ISO 14001 certification)
- Use of HDPE & PET bottles
- Pesticide labels



Pesticide industry in Sri Lanka

Regulation by

Pesticides Act No.33 of 1980

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

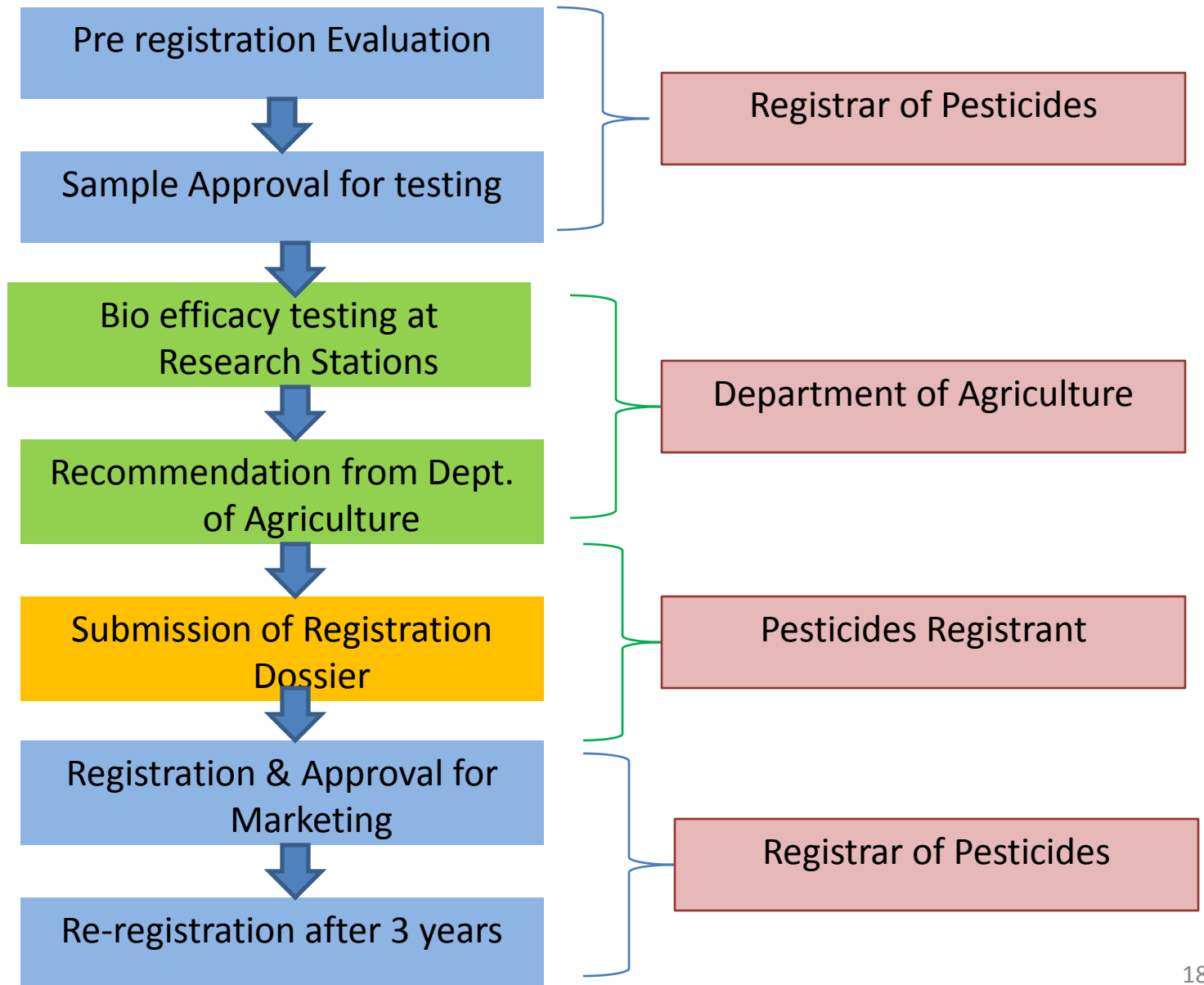
Authorized person

Registrar of Pesticides

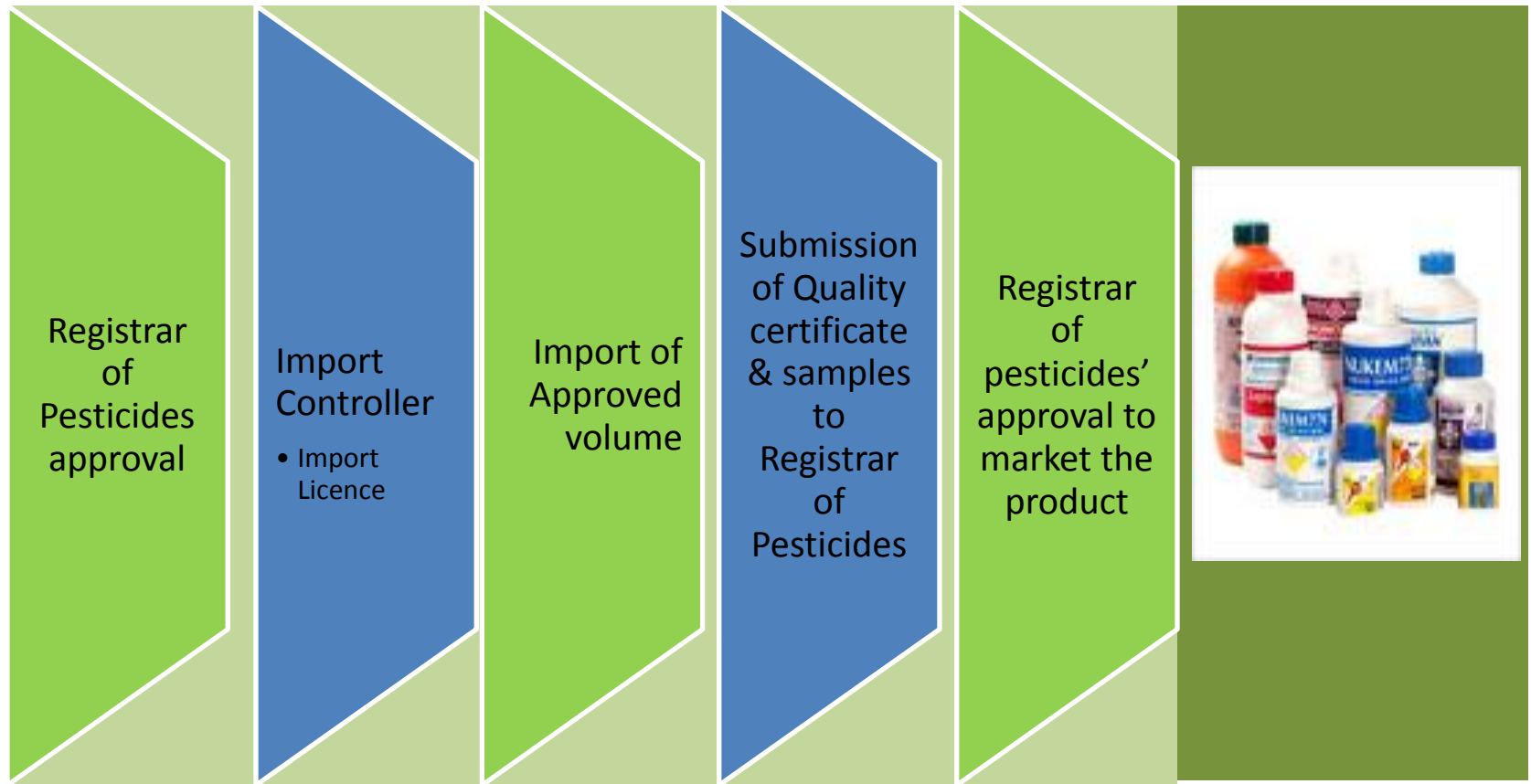
Office of the Registrar of Pesticides

Only Registered products at the office of the Registrar of Pesticides can be marketed in Sri Lanka

Introduction of a new pesticide to Sri Lanka



Import of pesticides



Contribution on Sustainable Development

1. Research and Development



2. Technology Transfer and Extension



3. Stewardship, Education and Training



Thank you.

