



**Approved crop protection chemicals and biological agents; integrated insect pest, disease, weeds and crop management methods;**

Dr. D. Kilalo

Dept of Plant Science and Crop Protection

# Outline

- Why approval?
- Key international agreements
- What is common among them
- How they support chemical management
- Laws, regulation and standards that control pesticide usage
- Concerns about pesticide use
- Restricted products
- Seed treatments
- IPM

# Why approval?

- Pesticides used are approved for use after undergoing various checks guided by law of the land.
- There are regulations that guide the, manufacture, formulation, importation, packing, distribution and sale
- The scientific information, effect, value, quality of a pesticide must be affirmed by a regulator and registered before the product can be distributed for use in a country

# Key international agreements on pesticides

## Common thread among them

- Reduce harm to human health and environment
- Support pesticide management (labelling, trade and movement, ID of alternatives)
- Provide information about pesticides (hazards associated with them)
- List banned and restricted pesticides

# Key international agreements on pesticides

They are:

- Stockholm convention: Persistent organic pollutants (POPs) -dirty 12
  - Chemicals that do not break down easily, stay long in environment and can move long distances
  - they bioaccumulate and biomagnify
- World health organization (WHO)
- Restricted pesticides that are highly hazardous to human health.
  - Classified pesticides into I (R), II (Y) , III (B) and IV (G)  
Red highly hazardous

# Key international agreements on pesticides

- Rotterdam convention: Prior informed consent
  - Country intending to import must be informed of everything dangers and goodness alike about the product so that it can make a decision' It covers 33 pesticides and 11 industrial chemicals
- Montreal protocol: Chemicals that emit gas that is destroying the ozone layer
  - e.g methyl bromide (2015) and various fumigants
  - Refrigeration gases, foam foaming, industrial cleaning, fire safety (even gas released from animal rumen)

# Laws and regulations

- These concern the use of chemicals under certain conditions and if they are not met, produce will not be marketed where these laws and regulations operate
- E.g E U



# Standards (more for horticulture)

- Have sets of rules of production of a certain produce. They have to be met for the produce to obtain market in the area where the rules prevail. Rules take care of these concerns:
  - Good agricultural practices- include keeping records about what has been used . Critical for chemicals where one has to indicate why it was used
  - Traceability
  - Workers health
  - Safety for the workers in the field and when packing
  - Environmental protection to ensure sustainability



# Concerns about pesticide dependence

- **Pest resistance**
- **Environmental persistence**
- **Bioaccumulation:** when a chemical accumulates in animal fat (historical fact)
- **Biomagnification:** when an organism accumulates residues at higher concentrations than the organisms they consume

# Concerns about pesticides and the hazards in the environment

- US Environmental Protection Agency (EPA) created in 1970
- Charged with protecting environment and health of humans and animals
  - DDT banned in 1972
- Public concern has led to stringent regulation of pesticides, as well as changes in types of pesticides used



# Internationally restricted pesticides



2,4,5-T and its salts and esters	Chlormephos	Fenamiphos	Oxydemeton-methyl
3-Chloro-1,2-propanediol	Chlorobenzilate	Flocoumafen	Parathion
Acetalein	Chlorophacinone	Flucythrinate	Paris green
Alachlor	Coumaphos	Fluoroacetamide	Pentachlorobenzene
Aldicarb	Coumatetralyl	Formetanate	Pentachlorophenol and its salts and esters
Aldrin	Cyfluthrin	Furathiocarb	Perfluorooctane sulfonic acid
Allyl alcohol	DDT	Hexachlorocyclohexane (HCH)	Phenylmercury acetate
Alpha hexachlorocyclohexane	Demeton-S-methyl	Heptachlor	Phorate
Azinphos-ethyl	Dichlorvos	Heptenophos	Phosphamidon
Azinphos-methyl	Diclotophos	Hexachlorobenzene	Propetamphos
Binapacryl	Dieldrin	Isoxathion	Sodium arsenite
Beta hexachlorocyclohexane	Difenacoum	Lead arsenate	Sodium cyanide
Beta-cyfluthrin	Difethialone	Lindane	Sodium fluoracetate
Blasticidin-S	Dinitro-ortho-cresol (DNOC)	Mecarbam	Strychnine
Brodifacoum	Dinoseb	Mercuric chloride	Sulfotep
Bromadiolone	Dinoterb	Mercuric oxide	Tebupirimfos
Bromethalin	Diphacinone	Mercury compounds	Tefluthrin
Butocarboxim	Disulfoton	Methamidophos	Terbufos
Butoxycarboxim	Dustable powder containing a combination of benomyl at or above 7% carbofuran at or above 10% and thiomyl at or above 15%	Methidathion	Thallium sulfate
Cadusafos	EDB (1,2-dibromoethane)	Methiocarb	Thiram
Calcium arsenate	Edifenphos	Methomyl	Thiofanox
Calcium cyanide	Endosulfan	Methyl bromide	Thiometon
Captafol	Endrin	Methyl-parathion	Toxaphene
Carbofuran	Ethyl p-nitrophenyl phenylphosphorothioate (EPN)	Mevinphos	Triazophos
Chlordane	Ethiofencarb	Mirex	Tributyl tin compounds
Chlordane	Ethoprophos	Monocrotophos	Vamidothion
Chlordimeform	Ethylene dichloride	Nicotine	Warfarin
Chlorethoxyfos	Ethylene oxide	Omethoate	Zeta-cypermethrin
Chlorfenvinphos	Famphur	Oxamyl	Zinc phosphide

# No to restricted products!

- Pesticides subject to international restrictions should not be used to protect seed fields or protect seeds for sale
- Those that are in Class Ia and Ib restricted by WHO they should only be handled by trained and registered people
- Persistent organic pollutants
- Ozone depleting substances and
- Pesticides that require prior informed consent for movement

# Seed treatments

Use only the chemicals that do not fall within those regulated by the international agreements or banned in the country

Captan-Widely used broad spectrum contact fungicide, however, poor on pythium and very dusty.

Metalaxyl-Narrow spectrum systemic fungicide with excellent activity against Pythium

Fludioxonil-broad spectrum contact fungicide, very effective against Fusarium, but poor Pythium activity.

Murtano- a combination product a mix of insecticide and fungicide

# Seed treatments

- Thiram only that product with less than 15% qualifies for use, anything above should not be used
- Benomyl any product with more than 7% should not be used

# Integrated pest management

- IPM: a balanced, tactical approach
- Anticipates and prevents damage
- Uses several tactics in combination
- Improves effectiveness, reduces side effects
- Relies on identification, measurement, assessment, and knowledge



# Why practice IPM?

- Maintains balanced ecosystems
- Pesticides alone may be ineffective
- Promotes a healthy environment
- Saves money
- Maintains a good public image

# Integrated Pest Management

is driven by decisions

1. Identify the pest and know its biology
2. Monitor and survey for pests
3. Set IPM goal: prevent, suppress, eradicate
4. Implement
  1. Select control strategies
  2. Timing
  3. Economics
  4. Environmental impacts
  5. Regulatory restrictions
5. Evaluate





**THANK YOU**