Global Container Management

TPSA Conference
Boise, Idaho
February 8, 2012

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Greetings from Canada!

Today's Presentation:

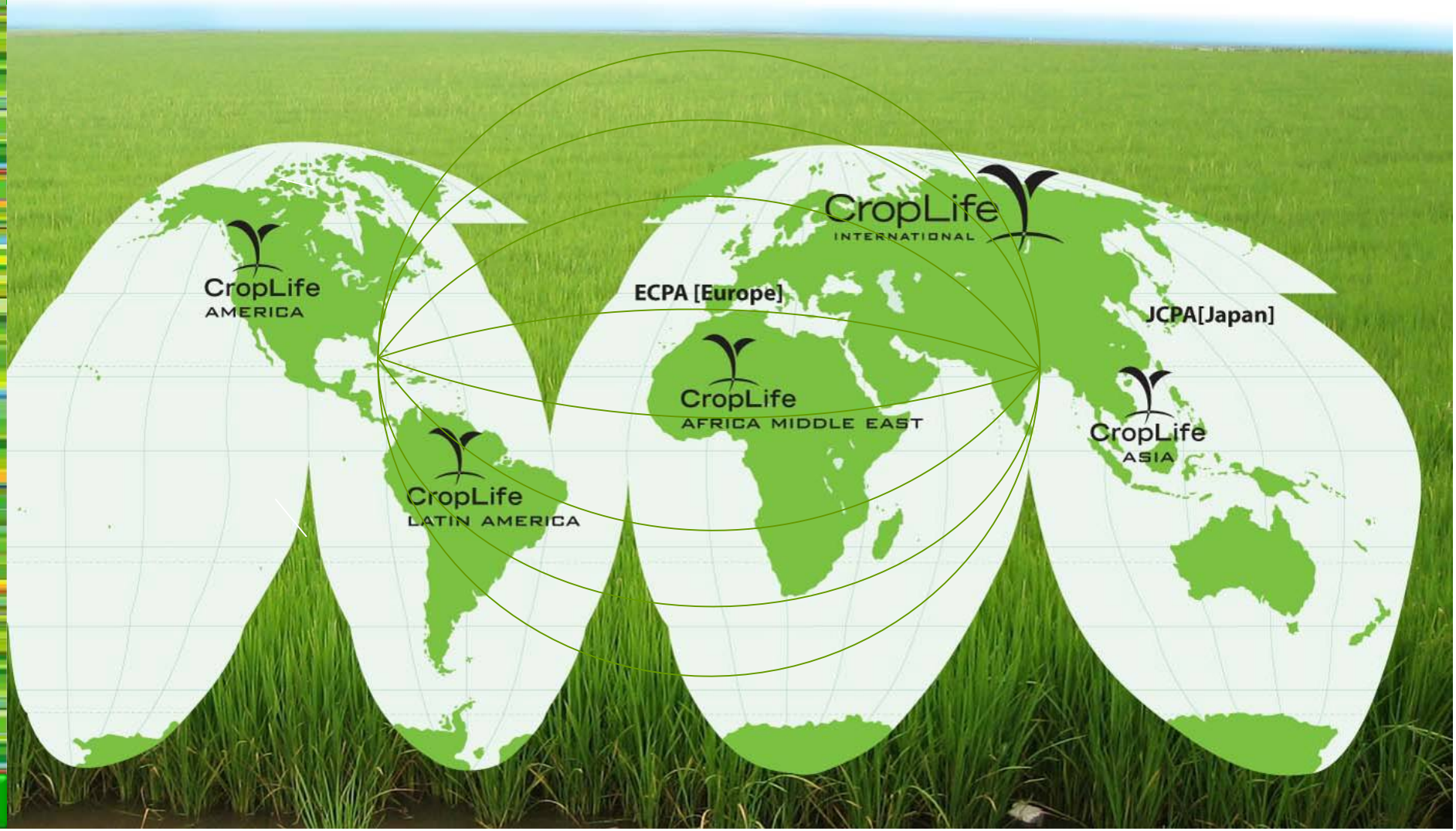
1. CropLife International's container management stewardship activity
2. Assessment of end use applications for recycling plastic from pesticide containers
3. Plastic drain tile technical assessment

CropLife International

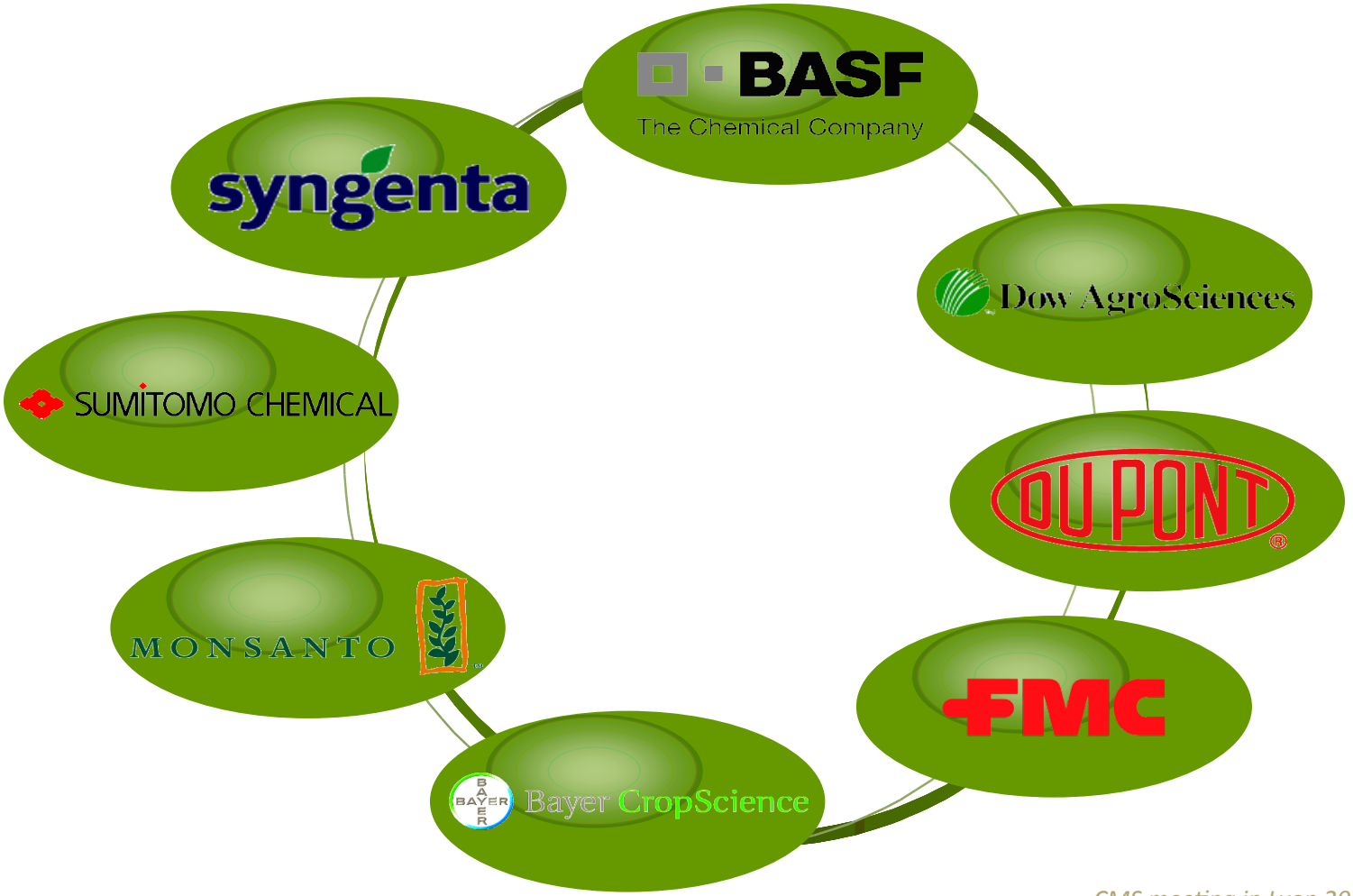
- A global trade association representing the global developers & manufacturers of crop protection technology & genetically engineered seeds.
- Heavily involved in advocacy, communications & stewardship activities in most countries
- Container management is a major stewardship activity

CropLife International - A Global Federation

Representing the plant science industry in 91 countries

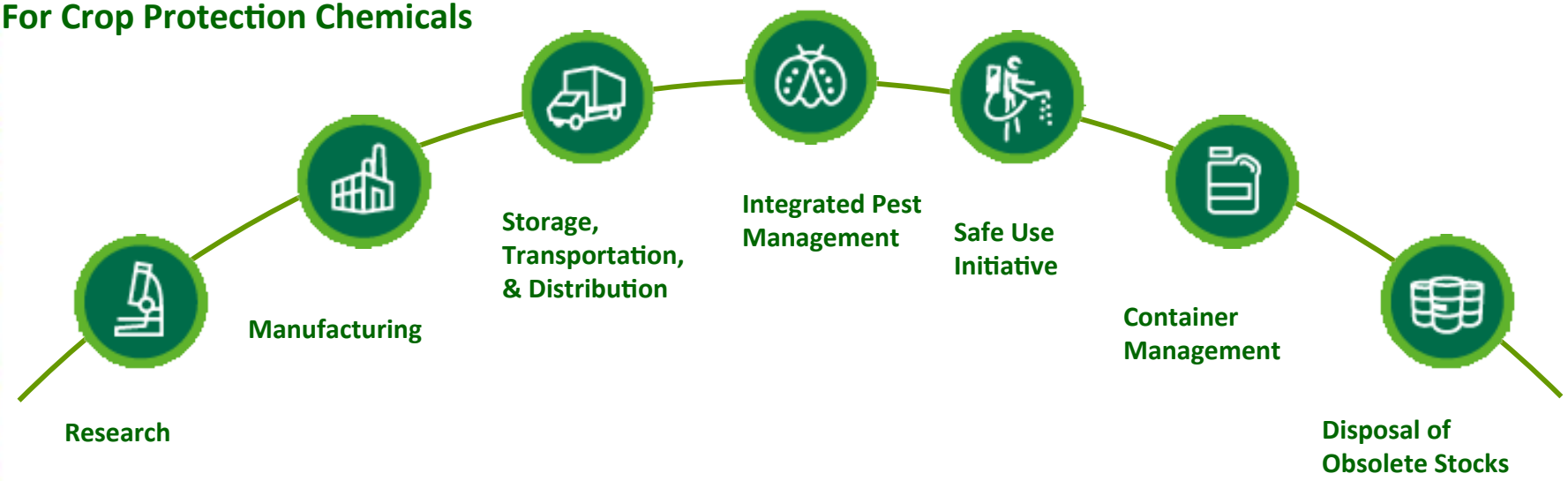


Members include 8 international companies



A Life Cycle Stewardship Approach

For Crop Protection Chemicals



Company Activities

Association Activities

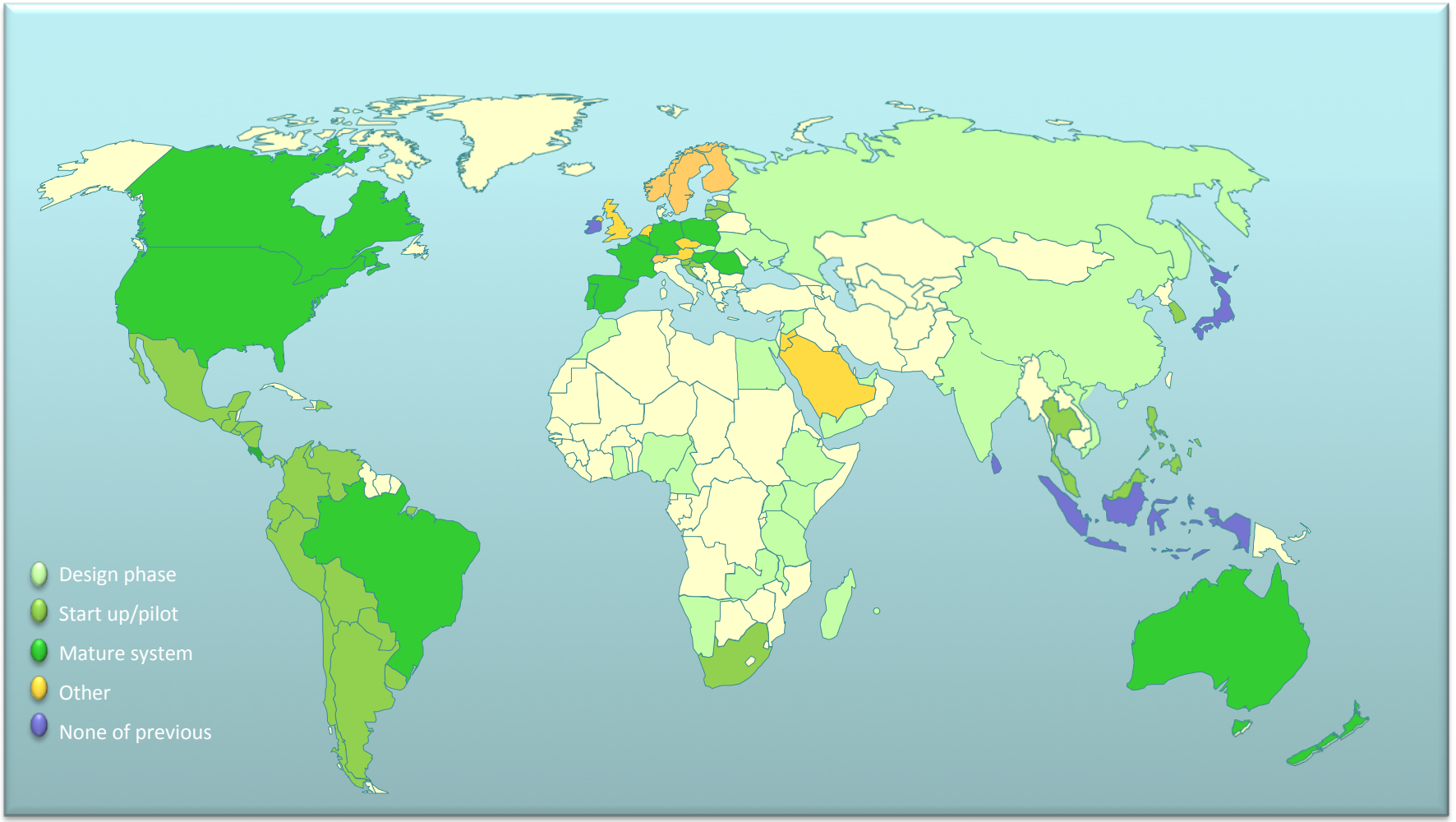
from **Discovery** *to* **Recovery**

CLI Container Management Vision

To have a safe and responsible management of empty, properly rinsed pesticide containers worldwide, with our industry recognized as a leader for this initiative

Stewarship Vision 2020

Collection Programs 2011



Collection Programs 2011

Status per continent

Africa	
Africa	Cameroon
Africa	Ethiopia
Africa	Egypt
Africa	Ghana
Africa	Kenya
Africa	Madagascar
Africa	Malawi
Africa	Mauritius
Africa	Morokko
Africa	Namibia
Africa	Nigeria
Africa	Tanzania
Africa	Uganda
Africa	Zambia
Africa	South-Africa

North America	
North America	USA
North America	Canada

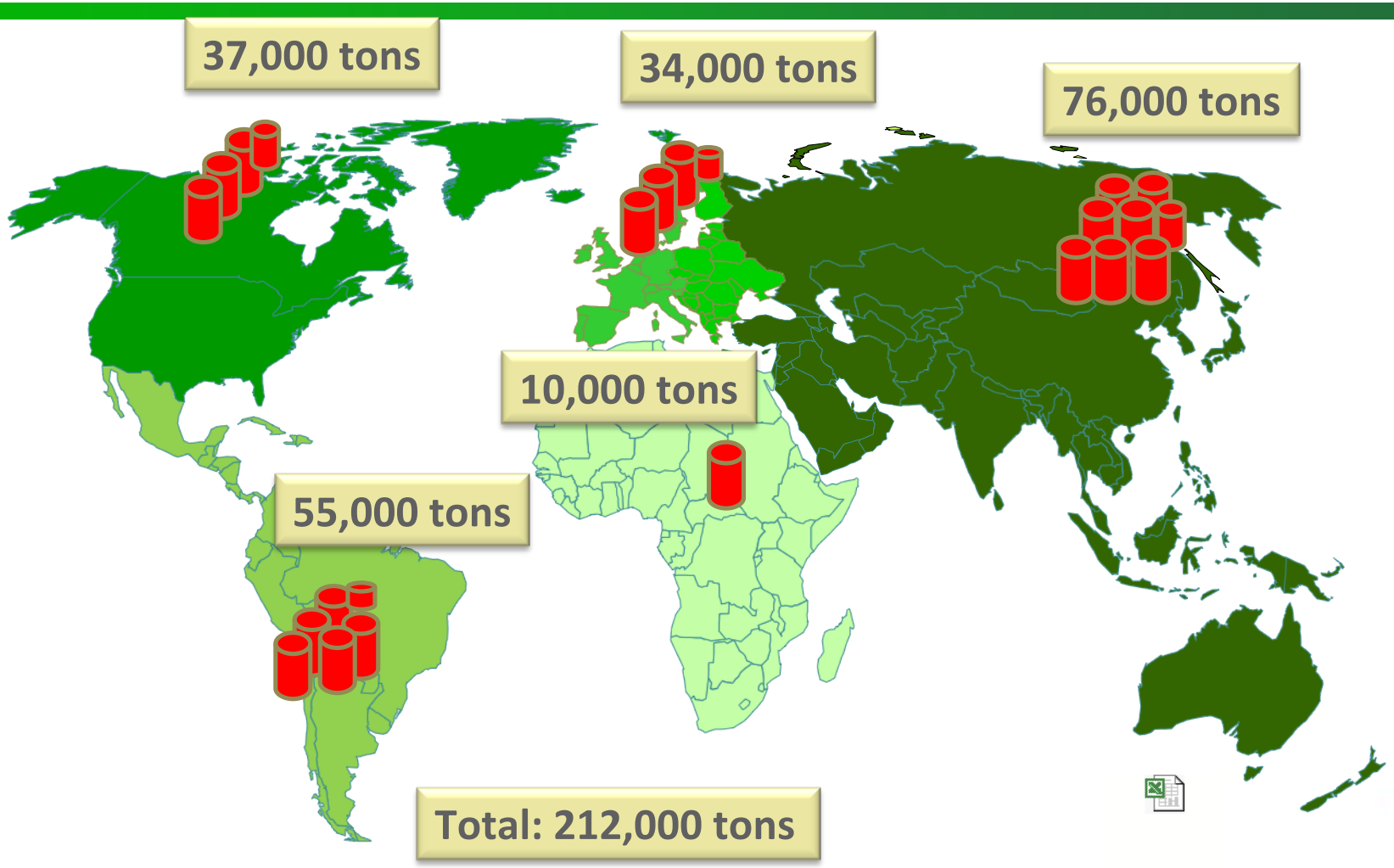
Latin America	
Latin America	Venezuela
Latin America	Argentina
Latin America	Bolivia
Latin America	Chile
Latin America	Colombia
Latin America	Ecuador
Latin America	El Salvador
Latin America	Guatemala
Latin America	Honduras
Latin America	Mexico
Latin America	Nicaragua
Latin America	Panama
Latin America	Peru
Latin America	Dominican Republic
Latin America	Uruguay
Latin America	Paraguay
Latin America	Brazil
Latin America	Costa Rica

Asia Pacific	
Asia Pacific	China
Asia Pacific	India
Asia Pacific	Syria
Asia Pacific	UAE
Asia Pacific	Vietnam
Asia Pacific	Yemen
Asia Pacific	South Korea
Asia Pacific	Malaysia
Asia Pacific	Philippines
Asia Pacific	Thailand
Asia Pacific	Australia
Asia Pacific	Jordan
Asia Pacific	kuwait
Asia Pacific	Saudi Arabia
Asia Pacific	Indonesia
Asia Pacific	Japan
Asia Pacific	Sri Lanka

Europe	
Europe	Russia
Europe	Slovakia
Europe	Turkey
Europe	Ukraine
Europe	Croatia
Europe	Latvia
Europe	Lithuania
Europe	Slovenia
Europe	Belgium
Europe	France
Europe	Germany
Europe	Hungary
Europe	Luxemburg
Europe	Poland
Europe	Portugal
Europe	Romania
Europe	Spain
Europe	Austria
Europe	Czech Republic
Europe	The Netherlands
Europe	UK
Europe	Ireland

- **Design phase**
- **Start up/pilot**
- **Mature system**
- **Other**
- **None of previous**

Estimated Packaging Mass (Global)



Container Management Programs - 2011

Stewardship

Programs established in 32 countries (mainly Europe and the Americas)

Pilots in 23 countries

Estimated global return rate for 2010 was 27.6%

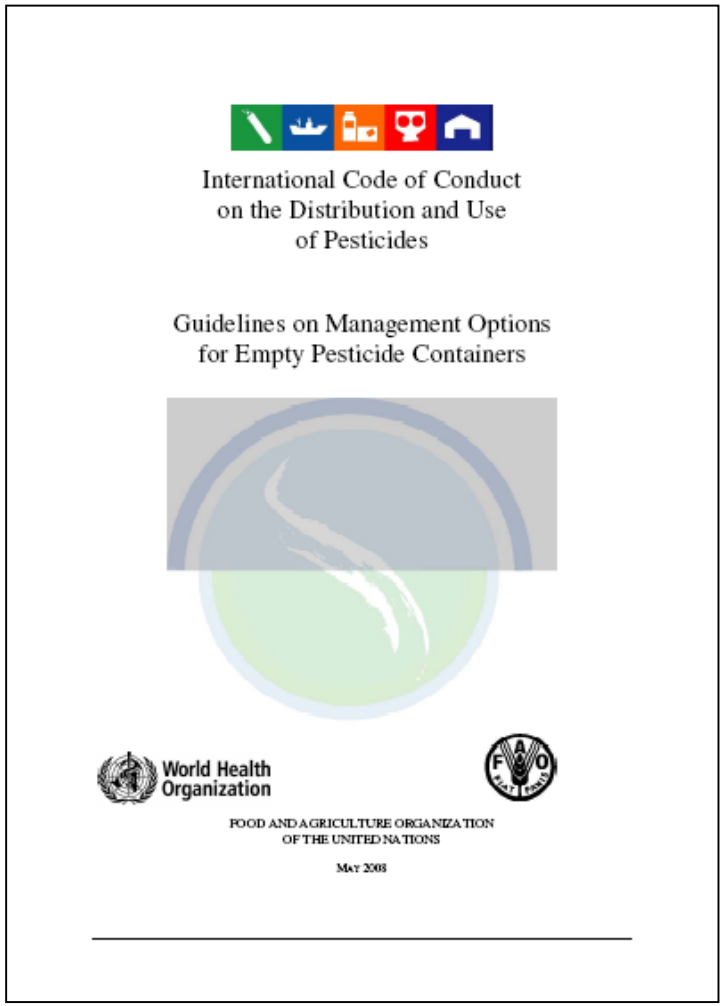
Information sharing

- Three databases for improved efficiencies globally:
  - Key performance indicators (KPI's)
    - Standard template for data input by country
  - Technical studies
    - Leachability of pesticides from plastic
  - Policy/position papers
    - Start-up "roadmap" for pilot programs

Key Performance Indicators

- Number of countries with a program
- Tonnes of recovered container plastic
- % recovery rate
- Total cost of program
- Cost per kg recovered by country & region
- Number of countries with non-hazardous classification

FAO/WHO


International Code of Conduct
on the Distribution and Use
of Pesticides

Guidelines on Management Options
for Empty Pesticide Containers

World Health Organization

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

May 2008

FAO/WHO recommend that countries should classify properly rinsed containers that have been inspected as non hazardous

May 2008

Container Management Objectives - 2012

Stewardship

- Communications:
  - Branding
  - 3X rinsing
  - Message development – all stakeholders incl external
- New pilot programs
- Eco-efficiency analysis – develop template
- Continue developing new end use applications with science based platform
- Broaden KPI's collected from each country
- Promote business models for improved efficiencies
- Promote HSE BMP policies = reduced footprint/no "incidents"

FOR YOUR FARM, YOUR FAMILY, OUR HEALTH AND OUR ENVIRONMENT

CleanFARMS

EMPTY PESTICIDE CONTAINER RECYCLING PROGRAM

Every return makes a difference...

and – It won't cost you a thing!

rinse

Pressure rinse or triple rinse your pesticide containers

remove

Completely remove the paper booklet from your pesticide containers

return

Return **clean, empty containers with no paper booklet** to your collection site

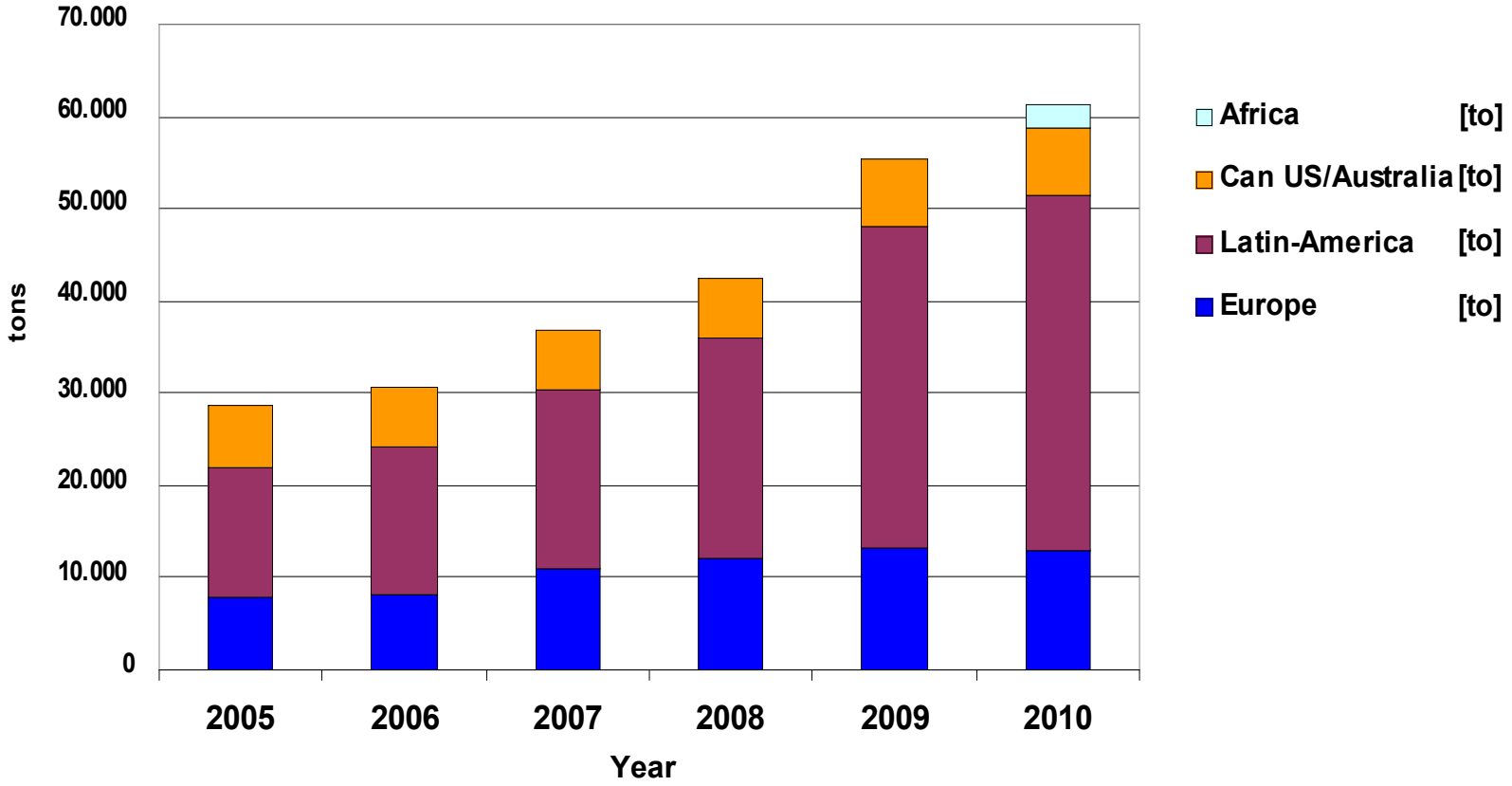
CropLife CANADA

stewardshipfirst ™

For more information contact your local dealer or visit www.croplife.ca

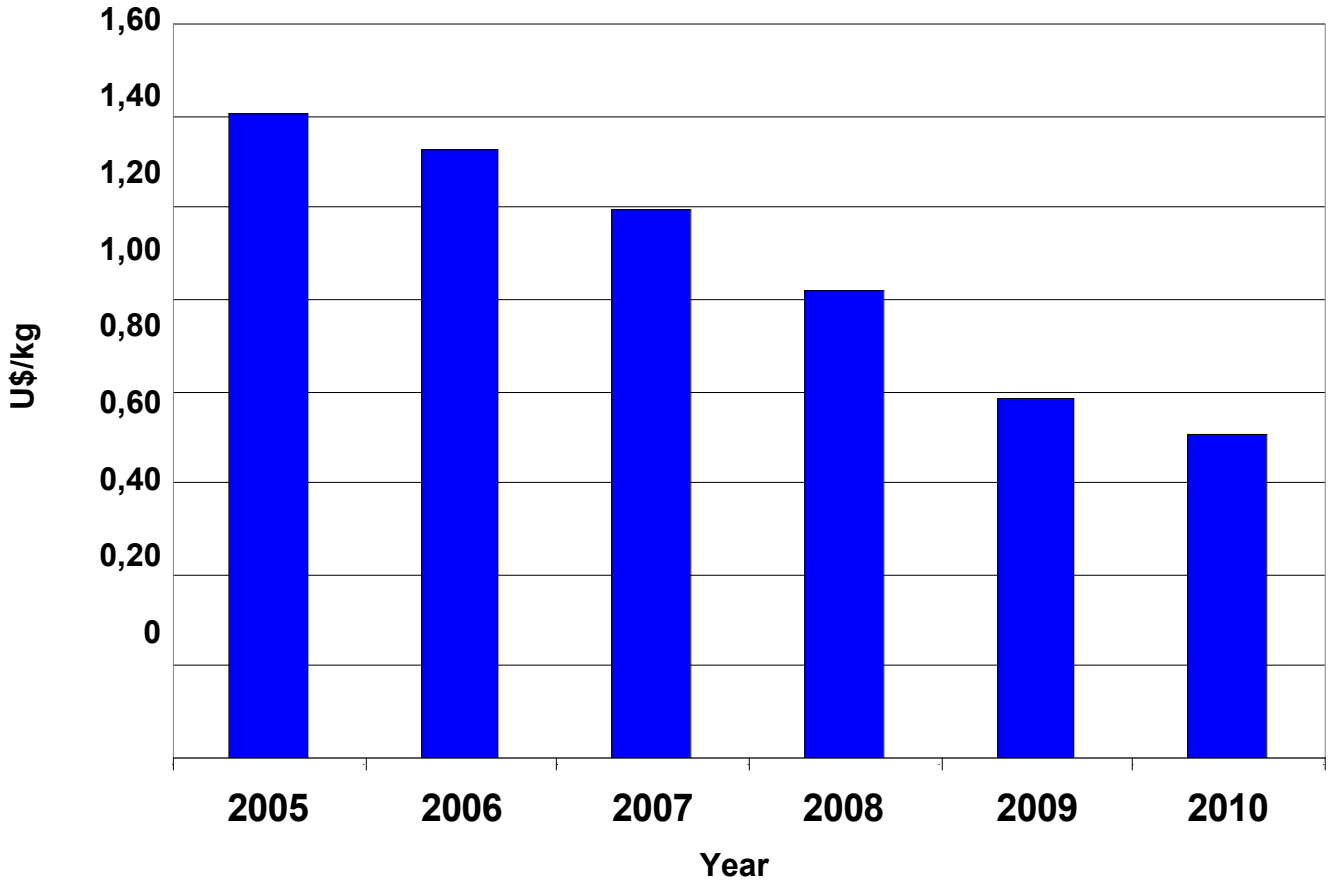
Follow these steps
X3
Triple-rinse your used pesticide containers!
Empty the container by placing it upside down over spray tank. Hold it there for 30 seconds more
1
Quarter-fill the container with water
2
Close the container and shake for 30 seconds
3
Empty the container by placing it upside down over spray tank. Hold it there for 30 seconds more
Always wear protective clothing
Protect your health – puncture the container so it cannot be re-used and send to recycler
CropLife INTERNATIONAL
CleanFARMS™
EMPTY PESTICIDE CONTAINER RECYCLING PROGRAM

Packaging collected



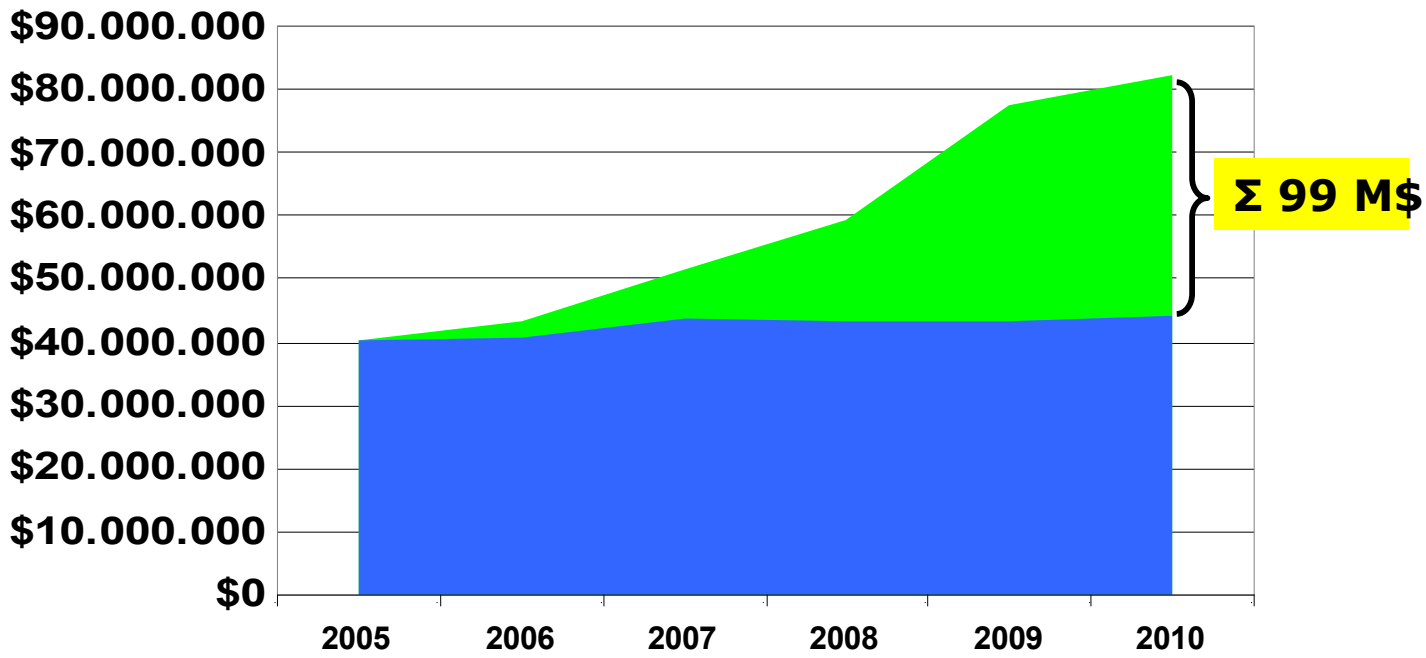
Cost per kg collected [US$/kg]

(global)



Cost Reduction [US$]

(actual global cost vs. cost based on specific cost of 2005)



New End Products from Container Management Plastic Recycling

New End Product

Statement

The use of recycled material in new end products not only means that less containers are going into incineration or landfill but also means less virgin material is being produced thus helping to conserve natural resources and lowering carbon emissions'.

New End Products

Countries with approved new end products

- ✓ Brazil (InPev)
- ✓ USA (ACRC)
- ✓ Canada (Clean Farm)
- ✓ Germany (Rigk Pamira)
- ✓ France (Adivalor)
- ✓ RSA

Brazil (InpEV) new end products

- Motor Oil containers (Triex)
- Car battery casing
- Sewage piping
- Waste bags for incineration
- Electricity Conducts boxes
- Waste drums (Fibre)
- Plastic Timber
- Tubing (corrugated)
- Electricity pylon plastic cross piece insulators
- HDPE Rope
- Caps for CP bottles
- Corrugated conduit (buried in walls for electric wires)
- PET Rope
- Concrete saver
- CPP containers (20 litre) with recycled material between virgin material

USA (ACRC) new end products

- Electricity Conducts boxes
- Waste drums (Fibre)
- Plastic Timber
- Plastic Pesticide Containers
- Incineration barrels (hazardous)
- Pallets (Industrial use only)
- Truck sub-floor components
- Liners for highway
- Agriculture drainage piping
- Highway guard rail posts
- Curb stops
- Construction site maps
- Speed bumps
- Commercial truck/manure spreader Decker board suction site maps
- Fence posts
- Marine Pilings
- Plastic lumber
- Railroad ties
- Sound barriers
- Agricultural fence posts
- Highway signposts
- Scaffold nailing strips
- Nailer boards for concrete forms
- Tiles

New end products rest of the World

France (Adivalor)

- Plastic Tubing (corrugated)
- Pallets
- Film
- Core for plastic industry

Germany (Rigk-Pamira)

- Electric Conduit and boxes
- Tubing (corrugated)
- Concrete saver

RSA (CAME)

- Fence posts

Canadian (Clean Farms)

- Agricultural drainage piping
- Industrial Garbage Bins

New End Product

CORRUGATED TUBE

WASTE BAG FOR INCENERATION

PLASTIC WOOD

New End Product

CONCRETE SAVER

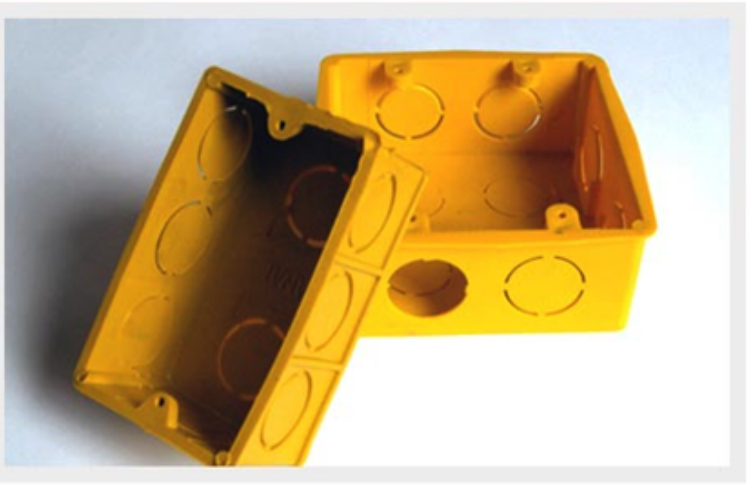
MOTOR OIL PACKAGE

HDPE ROPE

New End Product

CAPS

CORRUGATED TUBES



CONDUIT ELECTRIC BOX

BATTERY BOX

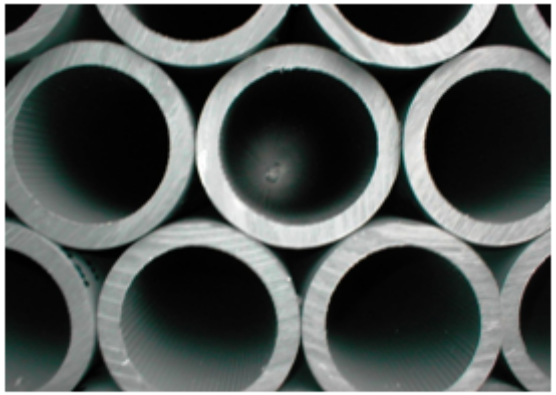
New End Product

PAIL 20 LITRE THREE LAYERS
(VIRGIN/PCR/VIRGIN)

New End Product

Farm Drainage Tile

New End Product



Core

Core with Film

New End Product

New development Adivalor

Electric Sheaths and Soil Pipe

Canadian study - containers recycled into farm drainage tile

-used back on the farm-

Drain Tile Study

- Testing for 29 molecules
- Canadian DT is only 10% container plastic – leachability is non-detectable
- Canadian plastic shipped to US – drain tile = 100% container plastic – for one chemical (chlorpyrifos) leachability is above Canadian water quality guidelines of 0.02 micrograms/L

Conclusions to date

- Leachability ppt'l to:
  - **Rate of flow – slower rate = higher pick-up**
  - **Higher number of flushes = lower pick-up**
  - **Lower temperature = lower pick-up**
  - **Length of tile… greater length = ??? (linear or will some sort of equilibrium be reached?)**

Background

- Since previous studies were only on 2-meter lengths, we didn't know what longer lengths will yield.
- Based on previous studies, we would like to determine:
  - Will the amount of pesticides leached be proportional to the length of the tile drains?
  - Will the amount of pesticides leached in a long tile drain be reduced over time?

Tile Drain Leaching Design

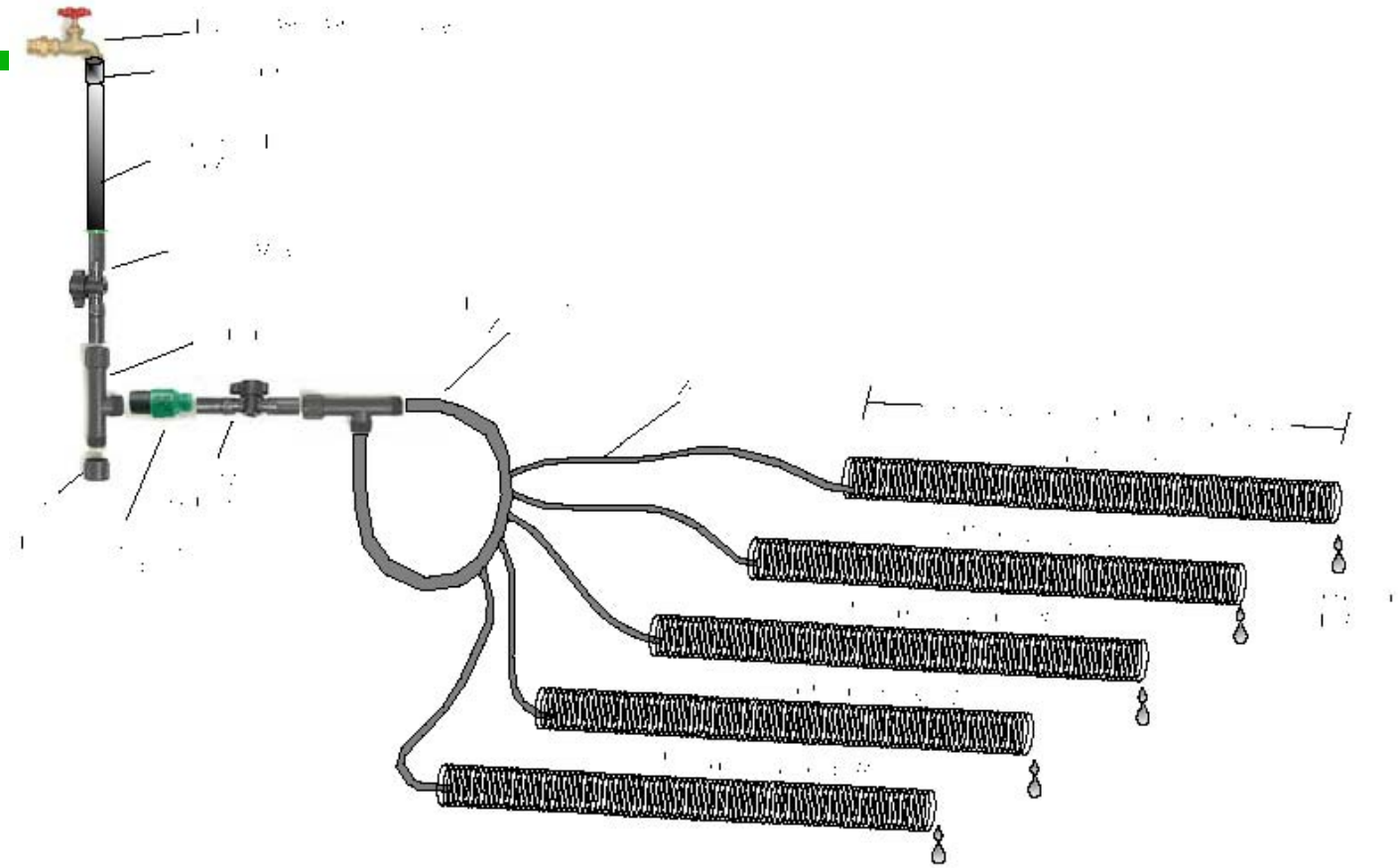
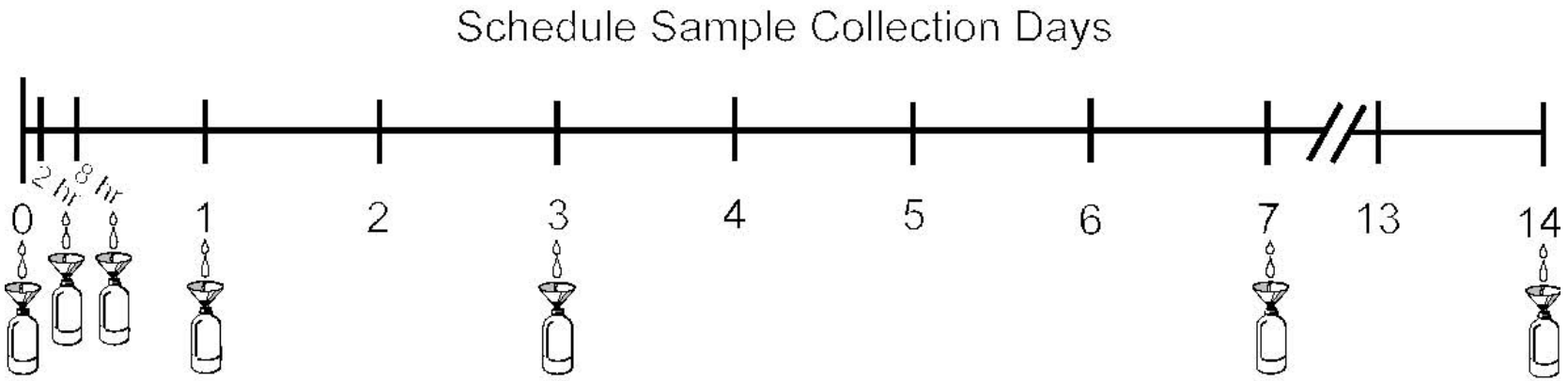


Fig. 2. Schematic diagram for a 100-m long tile drain leaching procedure.

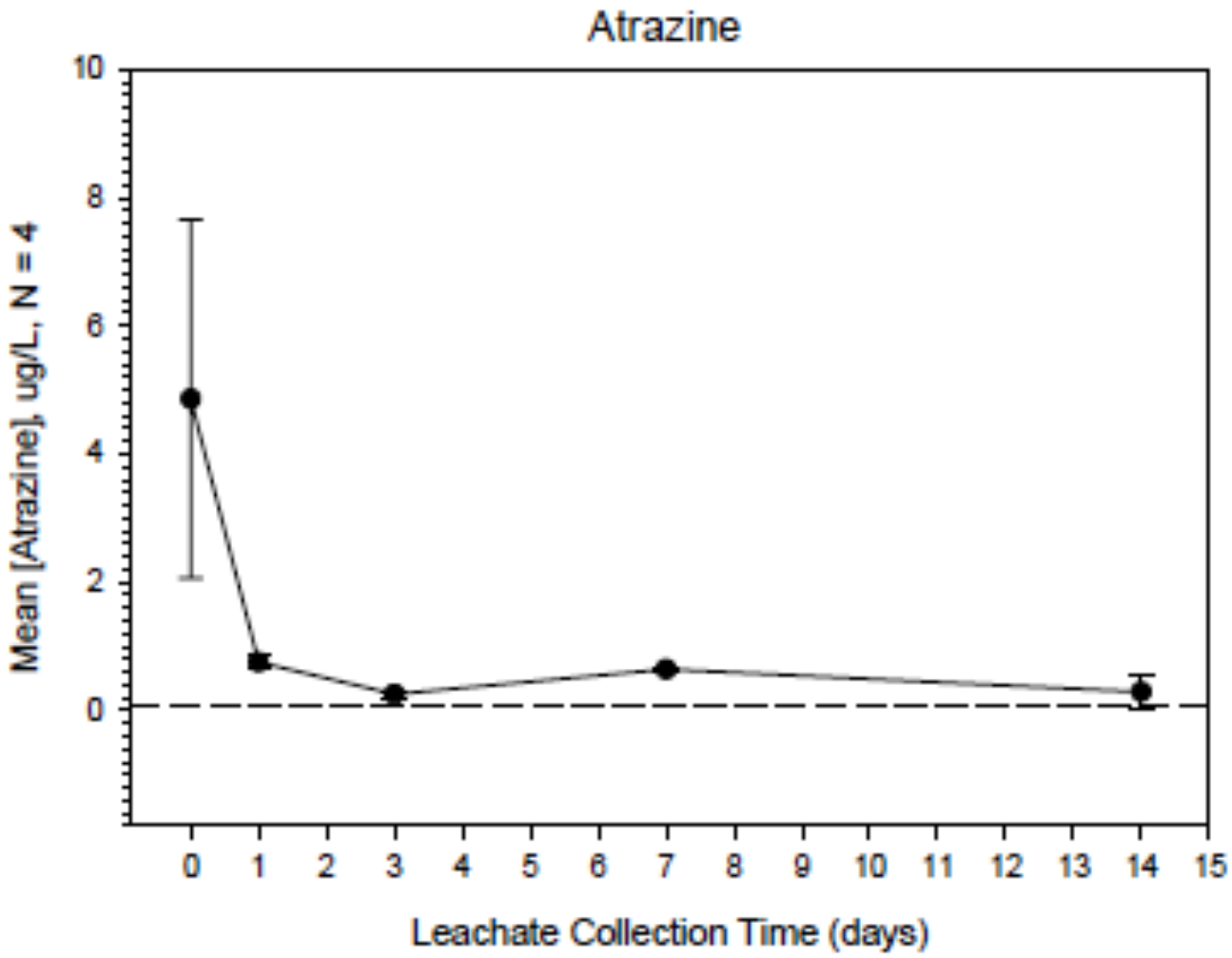
Schedule Sample Collection Days



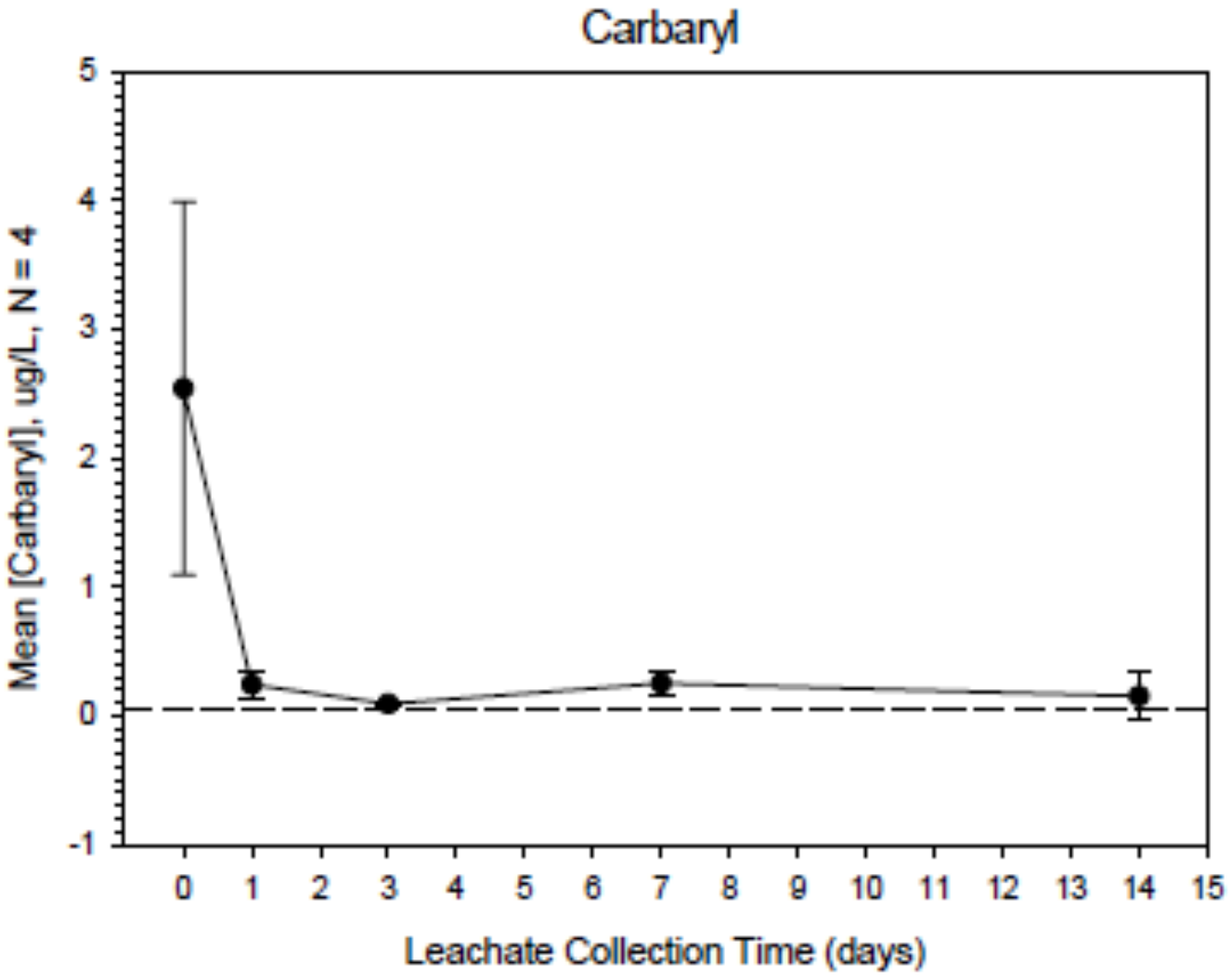
Leaching Procedure

Sampling Intervals	Flow Rate (1 L/min)	Total Flowing Water Passed Through Tile Drain (L)
Day 0 (initial)	1	0
2 Hours	1	120
8 Hours	1	460
Day 1 (24 hours)	1	1,440
Day 3 (72 hours)	1	4,320
Day 7 (168 hours)	1	10,080
Day 14 (336 hours)	1	20,160

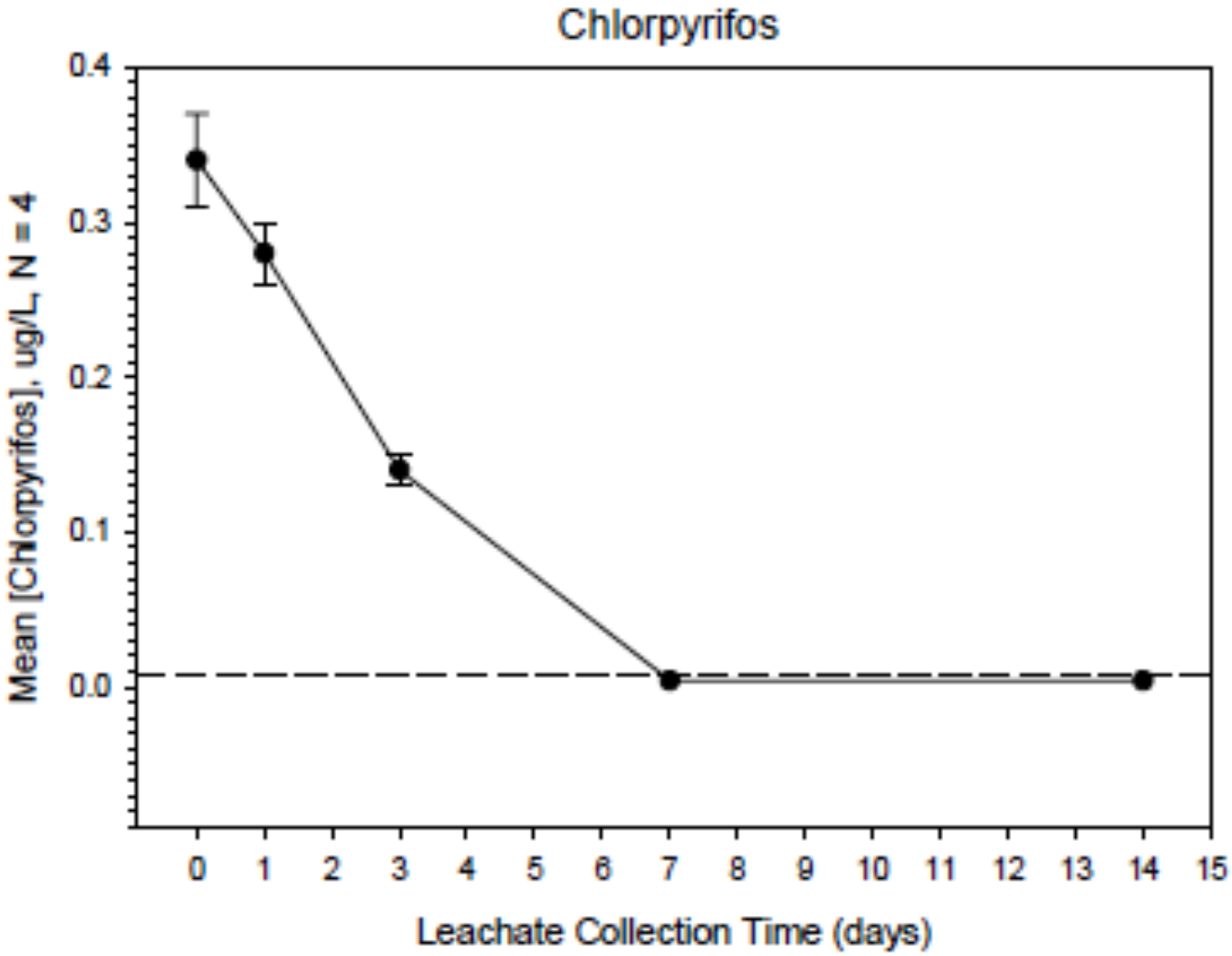
Atrazine


Atrazine
Mean [Atrazine], ug/L, N = 4
10
8
6
4
2
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Leachate Collection Time (days)

Carbaryl


Carbaryl
Mean [Carbaryl], ug/L, N = 4
5
4
3
2
1
0
-1
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Leachate Collection Time (days)

Chlorpyrifos



Conclusions

- The amount of pesticide leached was **not** proportional to the length of tile drain
- The initial leachable pesticide residues dissipated very rapidly in the first leaching event, & declined rapidly over time
- Most concentrations were below the LOD by day 3
- At day 14, no pesticides were exceeding the CWQG values

Conclusions (Continued)

- Contribution of pesticides from this source to surface waters over the 20 – 50 year lifetime of the tiles would present a de minimus risk to receptor organisms

Thank You