

Low Impact Weed Control - Protecting Drinking Water

Friday 12th March 2021

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Outline

- **The Challenge in Context – Limits and Consequences**
- **Scope and Impact of Best Practice – Point Source**
- **Best Practice – Point Source Risk Mitigation**
- **Catchment Monitoring – Role and Outcomes**
- **Questions / Discussion**

Rush Control in Grassland



Reference at Treatment June



Nine Months Later - 1st March



Limits for pesticides in drinking water

- The European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014) *as amended* sets limits for pesticides in DW:

Pesticides	0.1 µg/l
Pesticides Total	0.5 µg/l
Aldrin, Dieldrin, Heptachlor and Heptachlor Epoxide	0.03 µg/l

- EU limits are not health based.
- WHO Guideline Values (GLV) Health Based Value (HBV) – set for some but not all pesticides.

EU limits (above) are far more stringent than the WHO values.

Example: MCPA WHO HBV is 700 µg/l: 7000 times the EU limit of 0.1 µg/l



Drinking water



- 0.1 microgram/L = 0.1 ppb
(1 part in 10 billion)
- Equivalent to one drop in an Olympic-sized swimming pool (375,000 litres); 1 stem in 111,000 hay bales, 1 baked bean in 21 million cans, 1 second in 317 years
- Not a health-based standard
(Political decision from 1980 to use 0.1 ppb as a surrogate for zero.)



Why is there an issue?

- One foil seal contains enough pesticide to breach 0.1 microgram/L level along 30 km of a typical stream



What is the issue?



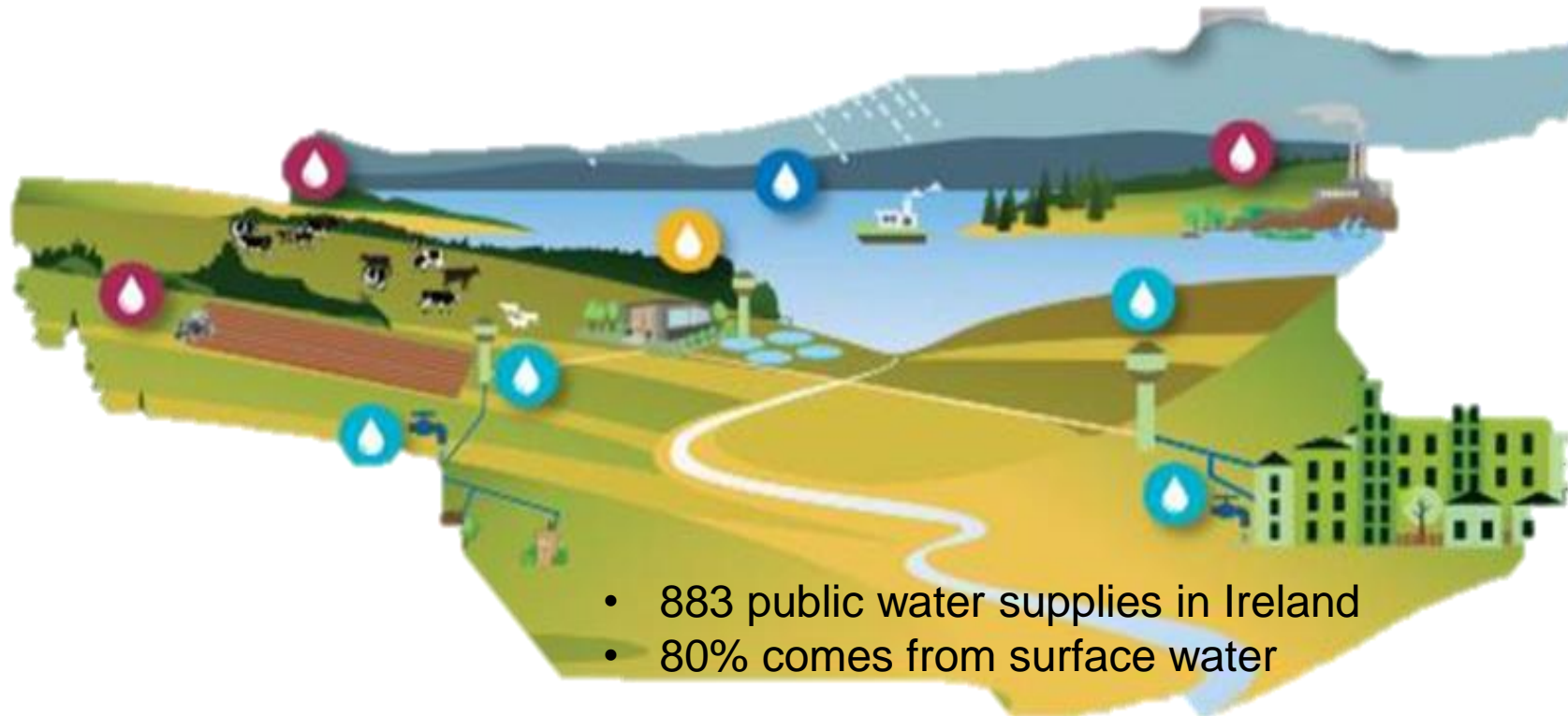
Multiple exceedances of legal limit for **MCPA** in drinking water sources



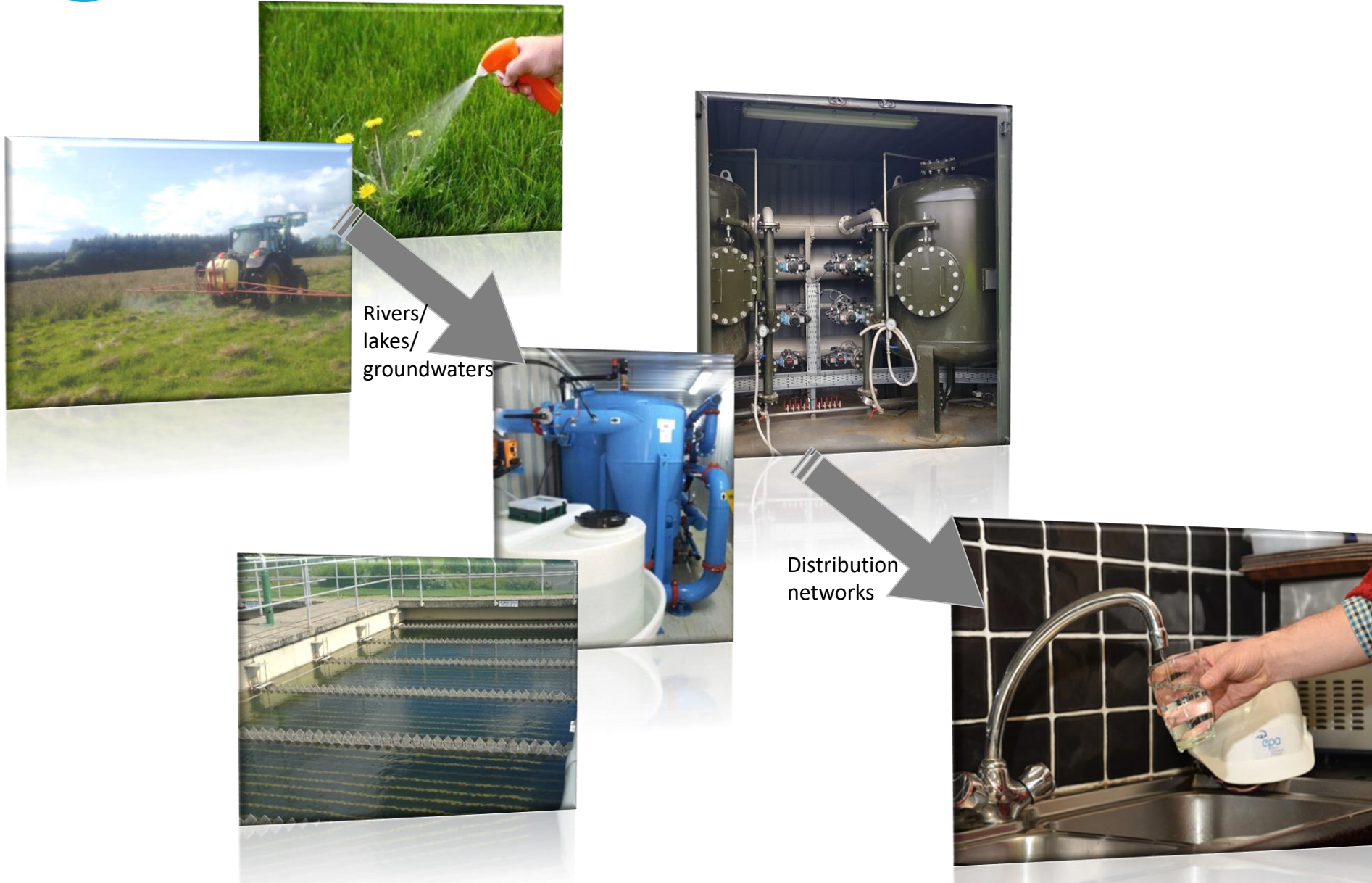
Drinking water standard for individual pesticides = 0.1 microgram/L



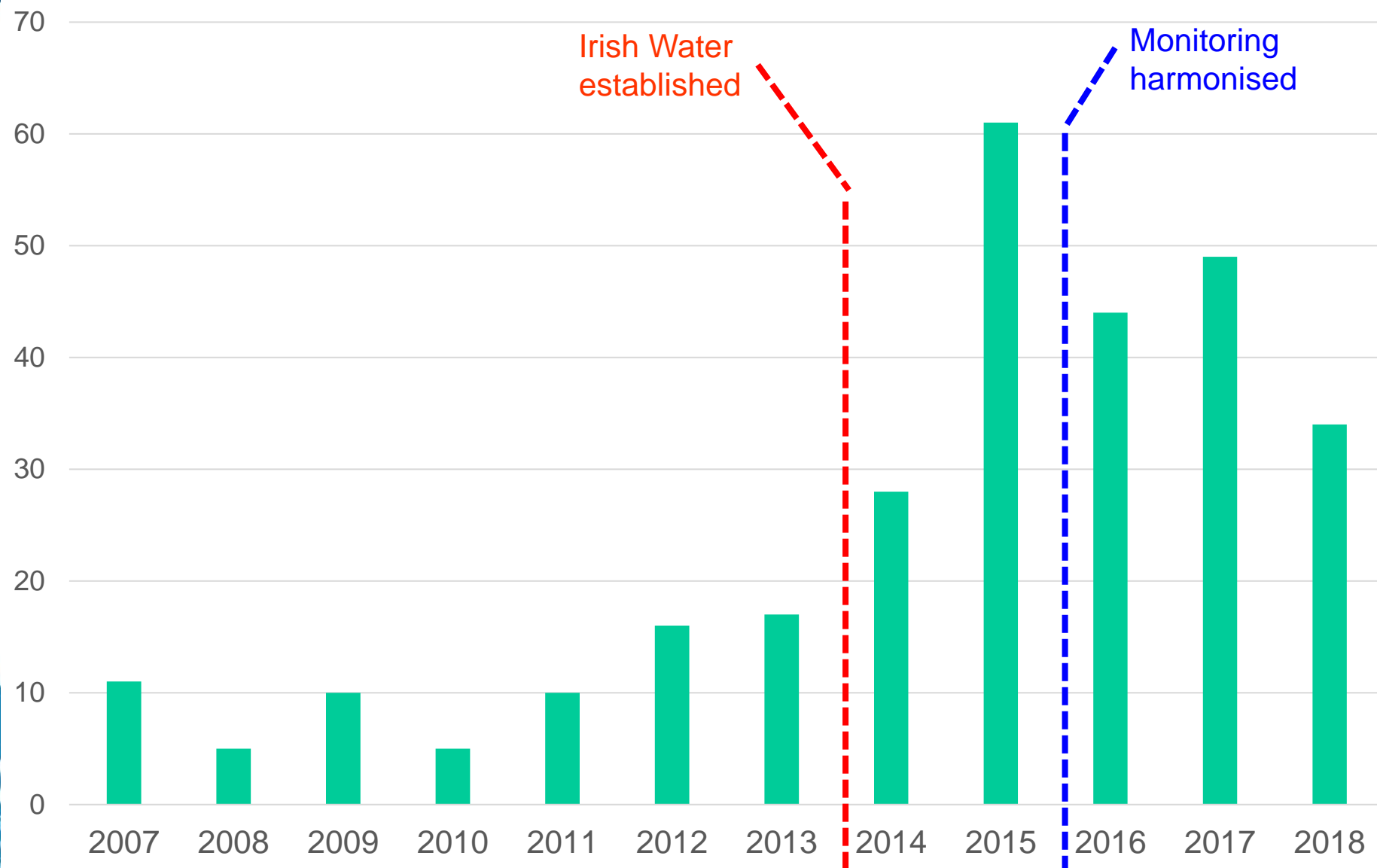
Losses of PPP to water – first principles



Pesticides: difficult to remove by treatment



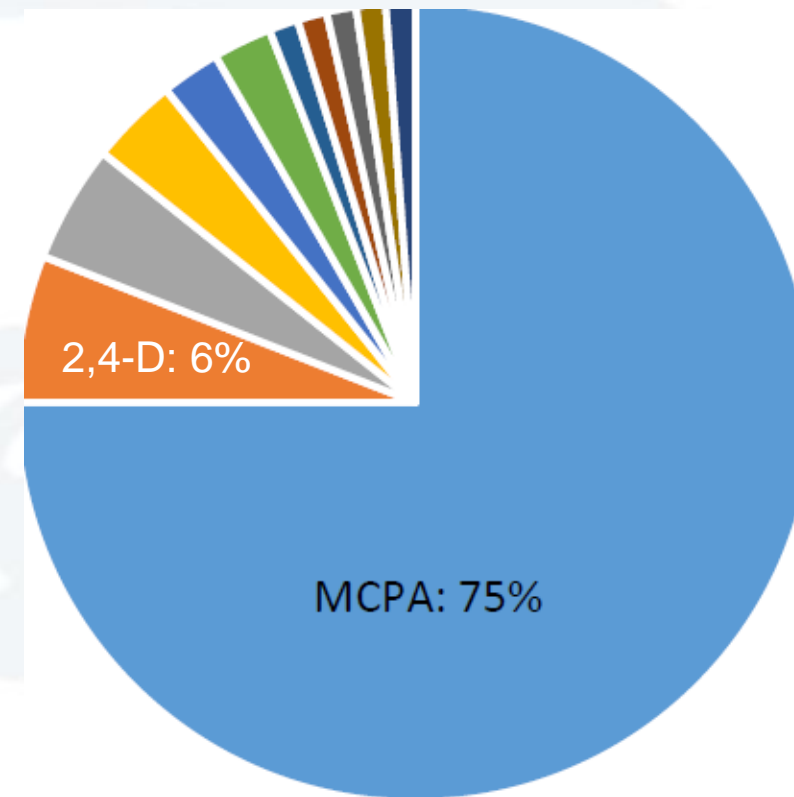
Number of public supplies with pesticide exceedances



What is being detected in DW

Pesticide	No. of Exceedances	
MCPA	63	
2,4-D	5	
Bentazone	4	
Glyphosate	3	
Fluroxypyr	2	
Mecoprop	2	
Clopyralid	1	
Metaldehyde	1	
Picloram	1	
Triclopyr	1	
Pesticides Total	1	

2018 breakdown by pesticide



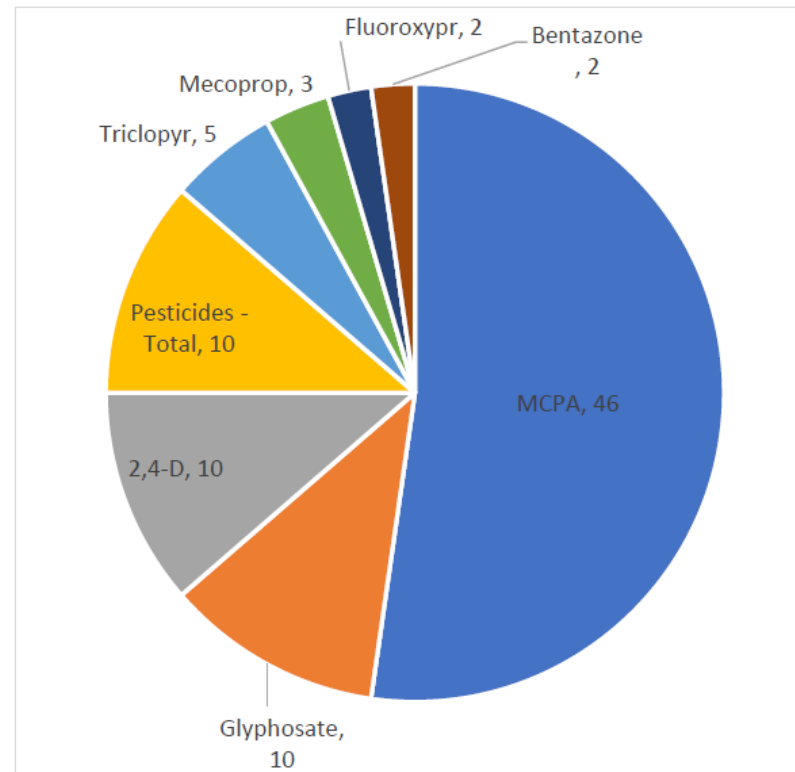
NPDWAG – EPA Update

2021 Summary

	No. of exceedances	No. of supplies
2020	91	36
2019	82	27
2018	85	34
2017	150	49
2016	137	44

Breakdown by pesticide:

Pesticide	No.
MCPA	46
Glyphosate	10
2,4-D	10
Pesticides – Total	10
Triclopyr	5
Mecoprop	3
Fluoroxypyr	2
Bentazone	2
Clopyralid	1
Metaldehyde	1
Metazachlor	1

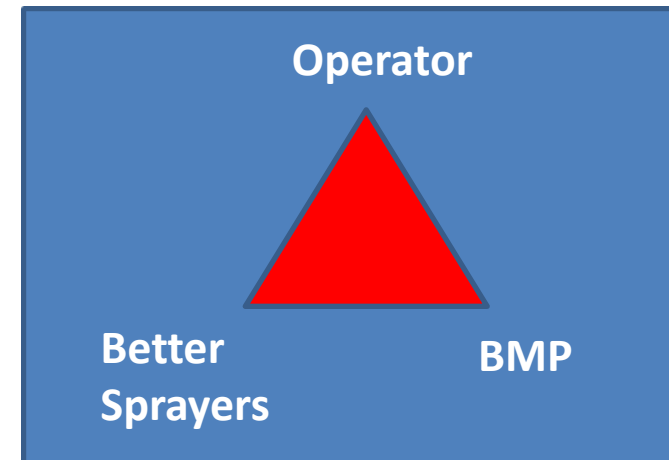


Best Practice Management



Reduce losses of Plant Protection Products to water

- Multi-stakeholder approach.
BMPs* = diagnosis + adapted measures
- Information & training of farmers /stakeholders on water protection.
- Apply a holistic water protection concept at catchment /field level, covering all key pollution sources & pathways (process view)
- Promote integration of BMPs into official trainings and support programs



* Best Management Practices

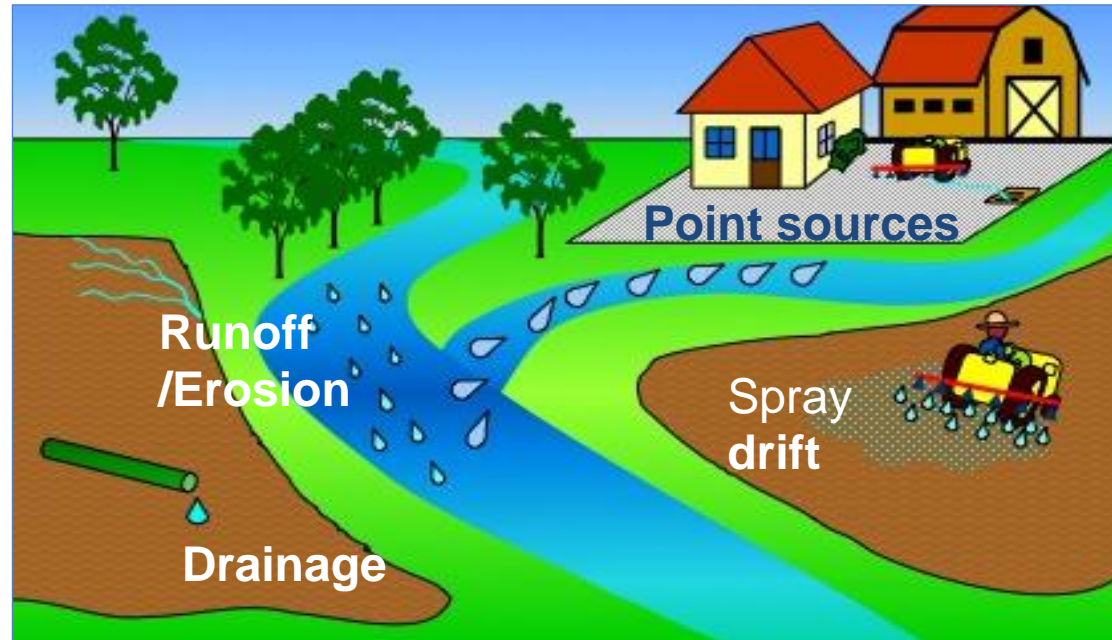
Main Entry Routes of PPP to Surface Water

Diffuse sources from the field:

These can be reduced

Point sources from the farmyard:

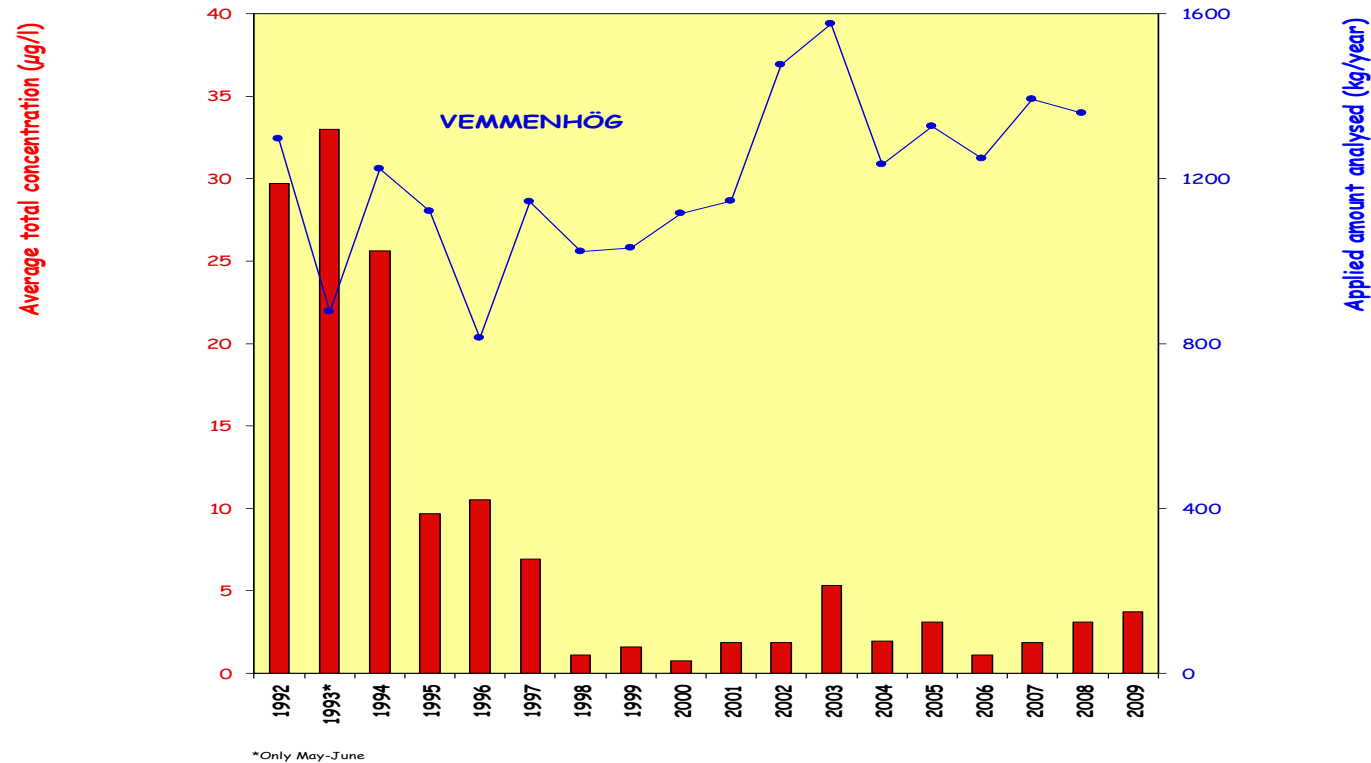
Can largely be avoided



Implementation of BMP works!

Advice + Improved Equipment + Better Operation reduced PPP losses to surface water by 90% : Example Vemmenhoeg Sweden

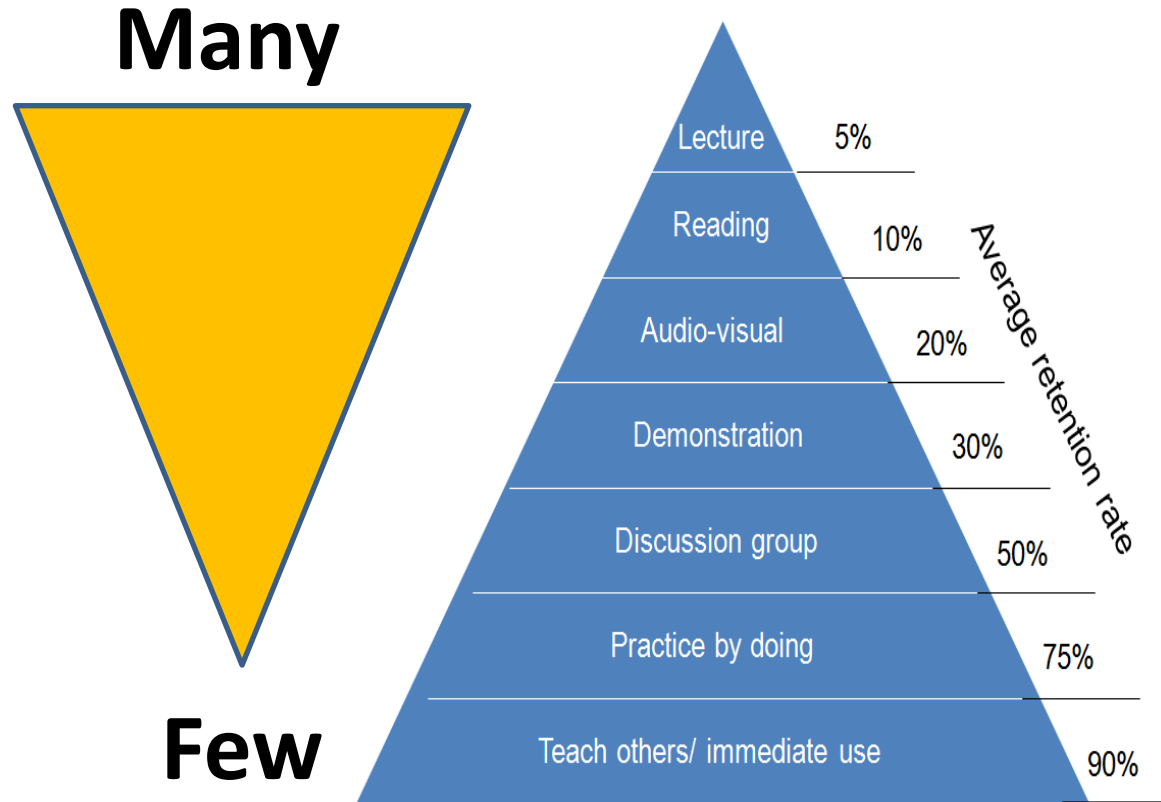
Average total pesticide concentration May-Sept 1992-2009



Source: J. Kreuger, Swedish University of Agricultural Sciences Lund

Implementation starts with awareness

Creating Awareness & Knowledge



Goal:

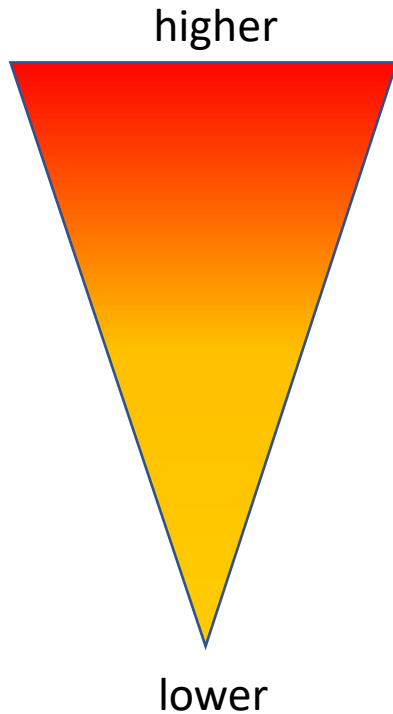
Structured dissemination of knowledge about the main contamination pathways for pesticides:

- Point sources
- Spray drift
- Runoff / erosion
- Drainage / leaching

Source: National Training Laboratories, Maine, USA

Avoid PPP losses from point sources

Awareness of key risks helps focus on prevention

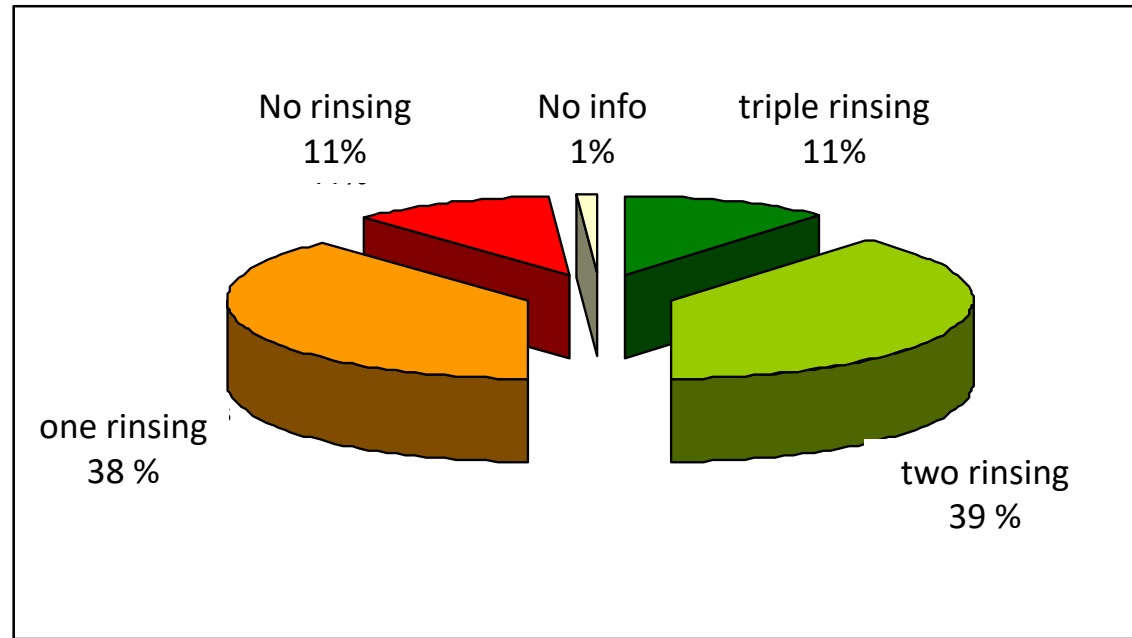


Key Risks

- **Sprayer Cleaning**
- **Mixing and Loading**
- **Remnant Management**
- **Empty Container Disposal**
- Transport to the field
- Farm pesticide storage
- Transport to the farm



Rinsing Practice (Fieldsprayers)

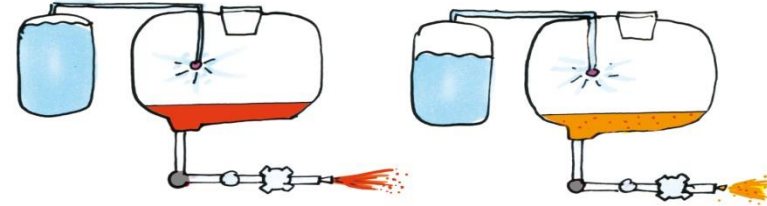


Triple Rinsing Takes time and is Inconvenient

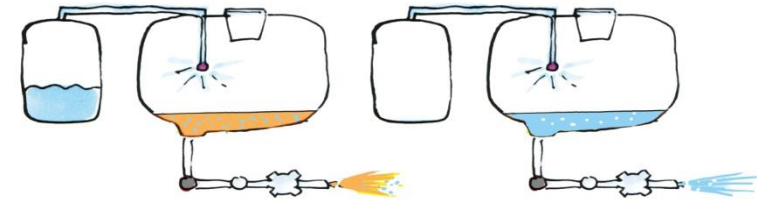
We Assume that Triple Rinsing is Not Always Done

Best Management Practice (key recommendations)

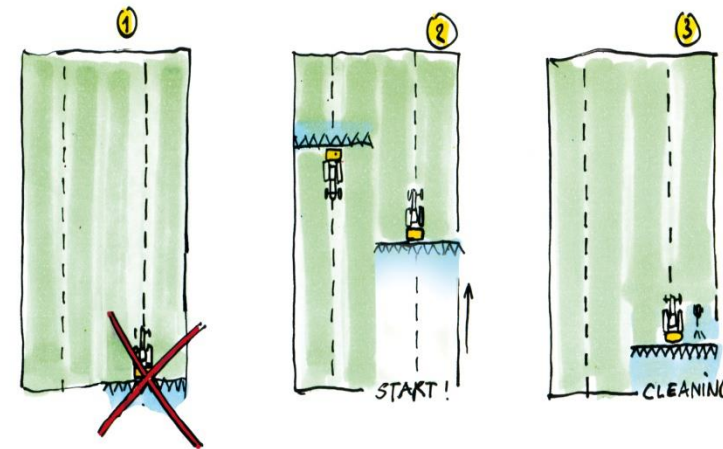
Cleaning Inside (after spraying)



Rinse Three Times

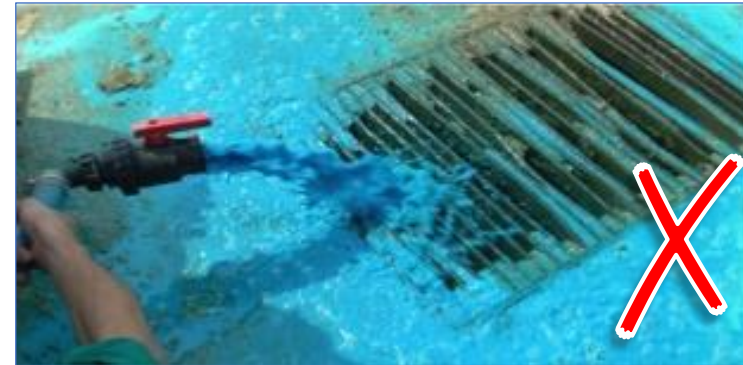


Spray Diluted Spray Solution Out in Field Where You Have Started Spraying



Dumping of undiluted residual spray volume is a high risk for creating point source water pollution.

- ▶ Dumping Residual Volumes on Hard Surfaces Without Collection Devices must Be Avoided.
- ▶ Cleaning of Sprayers Need To Be Executed on Biologic Active Areas, If No Special Washing Place Exists.
- ▶ Contaminating Surface and Groundwater with Washing Water Must Be Avoided.



Outside cleaning device and cleaning in the field

- ▶ Example: 25 l washing water at 4 bar removed 97,5 % of residues if cleaned immediately after application (Deposits still wet).
- ▶ 10 hours after application 25l washing water removed only 70 % of the residues (Deposits were dry).
- ▶ 125 l washing water, 10 hours after application, were necessary to achieve a cleaning effect of 97,5 % (Debaer 2008).



Best cleaning results are achieved with high pressure cleaners immediately after application



Poor Management of Empty Containers is High Risk for Point Source Pollution.

Cleaning

Storage

Disposal



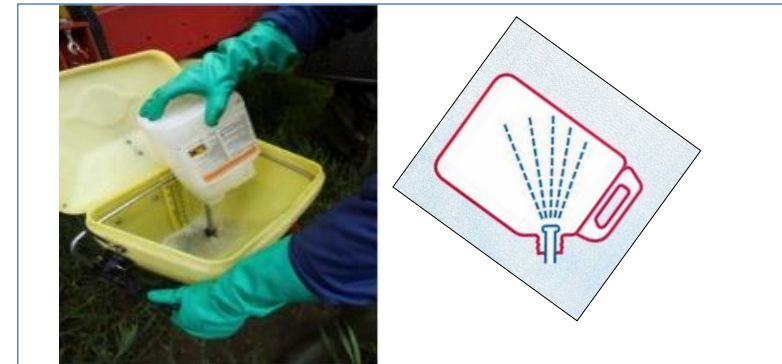
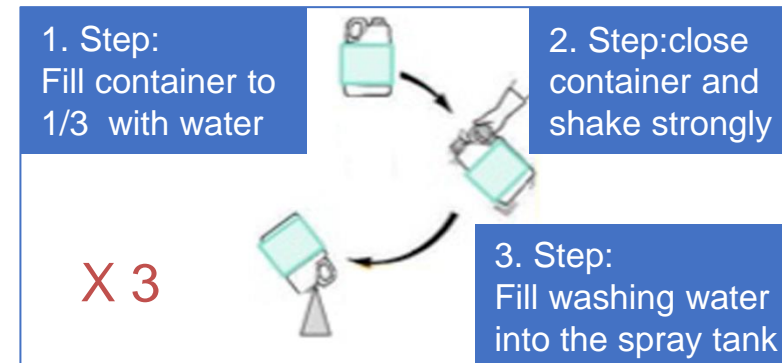
Empty Container Management

Triple Rinsing:

- ▶ Fill container to 1/3 with water, close it and shake it strongly.
- ▶ Empty washing water into the sprayer tank.

Repeat Procedure 3 times!

Use container cleaning nozzle in the induction hopper (if available): high pressure



Do not forget the cap and seals!

Clean container caps:

- ▶ Clean caps with clean water in the induction hopper.
- ▶ Put caps and seals after the cleaning in a clean plastic bag.

Dispose of Triple Rinsed Containers through the IFP Recycling Scheme



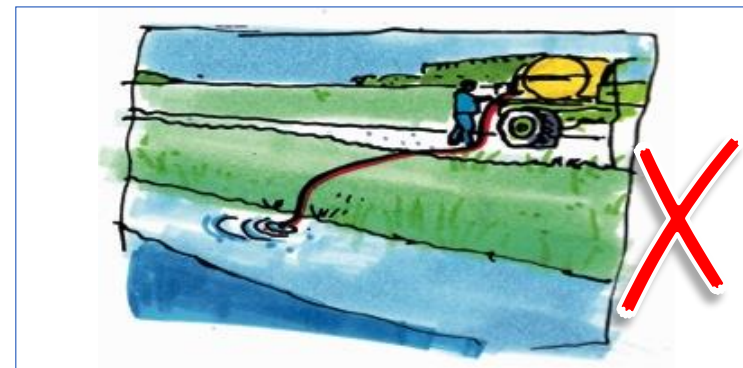
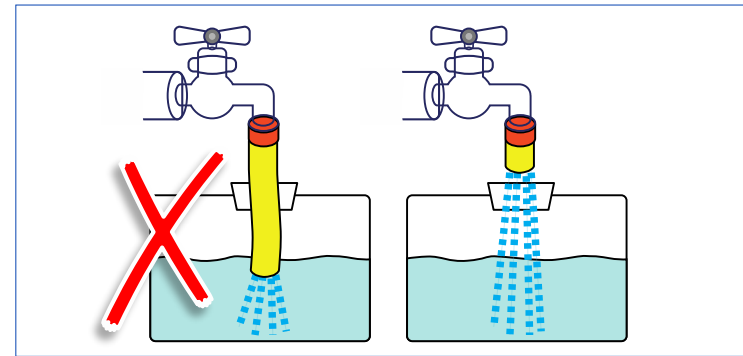
Correct storage of empty containers and disposal

- ▶ Empty and cleaned containers to be stored at a dry and protected place.
- ▶ Do not burn or bury empty containers.
- ▶ Use the local recycling system services



Precautionary Measures to Protect Water Sources

- ▶ Never connect a water source directly with the spray solution (Avoid risk of backflow by an appropriate valve).
- ▶ Never take water directly out of a water course or well.
- ▶ Always use an intermediary tank if water is sourced directly from a water body.



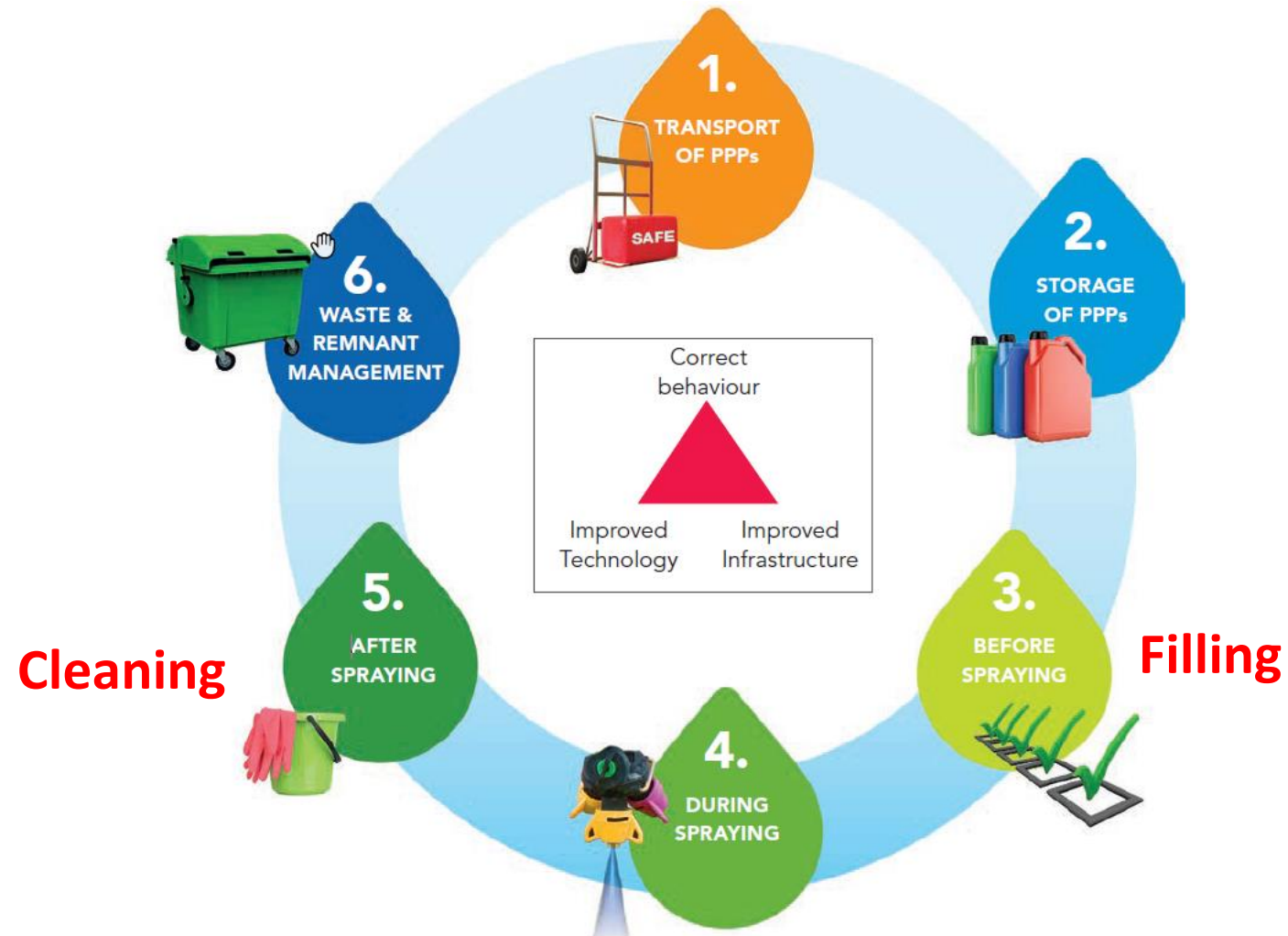
Mixing & Loading

Avoid Tank Overflow

Pay full attention when filling the sprayer. No other activities or distractions!

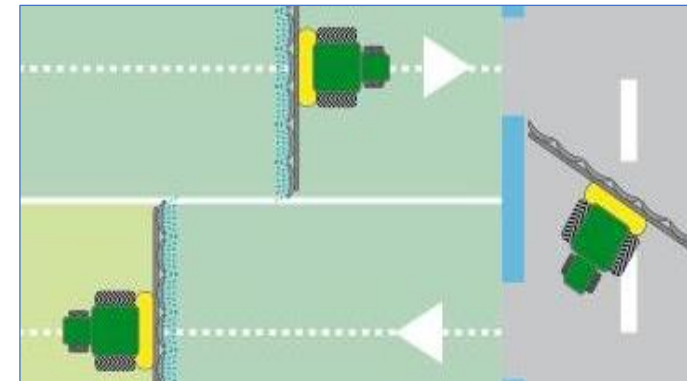


BMPs Toolbox : Strategic Triangle –



During application

- ▶ Never overspray water bodies.
- ▶ Do not overspray buffer strips.
- ▶ **Do not overspray or hard surfaces** (Studies showed that runoff from hard surface access roads can be an important source for point sources pollution).



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Buffer zones

- No-spray strip of a specified minimum width between the edge of a water body and the edge of the treated area.
- Legal requirement to comply with buffer zone specified on product label.
- Applies to all types of surface water body, e.g. ditches, streams, ponds, rivers and lakes.



Support / Stewardship

Focus on MCPA and rush control

BEWARE! Spraying rushes can very easily lead to breaches of the drinking water standard for pesticides, particularly if using MCPA products.

Why?

- MCPA is water soluble and takes several weeks to break down.
- Rushes thrive in poorly drained areas (with a water table near the surface) which are prone to runoff to nearby water bodies.

What to do?

- Use non-chemical control methods e.g. cutting, drainage, sward improvement.
- If spraying, target only the rush affected areas.
- If spraying, cut rushes one month before or one month after spraying to improve the effect of the spray.
- Consider weed wiping with an appropriate herbicide as a rush control option.

REMEMBER!

💧 A **SINGLE** drop of pesticide lost to a water body such as a typical small stream (1 metres wide, 0.3 metres deep), for example, can be enough to breach the legal limit for pesticides in drinking water of 0.1 part per billion along 30 km of its length.

💧 Always read and follow the product label.

💧 Be aware of how near water bodies (ditches, streams, ponds, rivers, lakes, etc.), drains or wells are to where you are working.

💧 Find out if the treatment area is in the vicinity of a drinking water abstraction point or well.

For further information on related topics such as container storage, triple rinsing, Integrated Pest Management or a list of approved Pesticide Advisors visit:

www.pcs.agriculture.gov.ie, www.teagasc.ie
or www.epa.ie



A
SINGLE
drop of
herbicide can
breach the
drinking water
limit in a small
stream for
30 km



Protecting Drinking Water from Pesticides

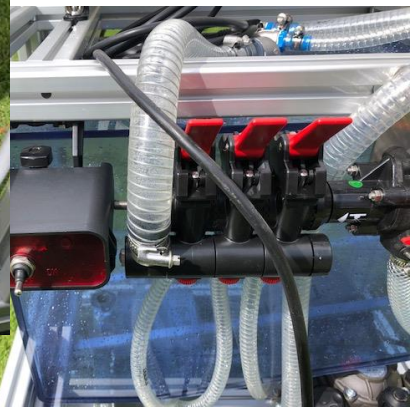
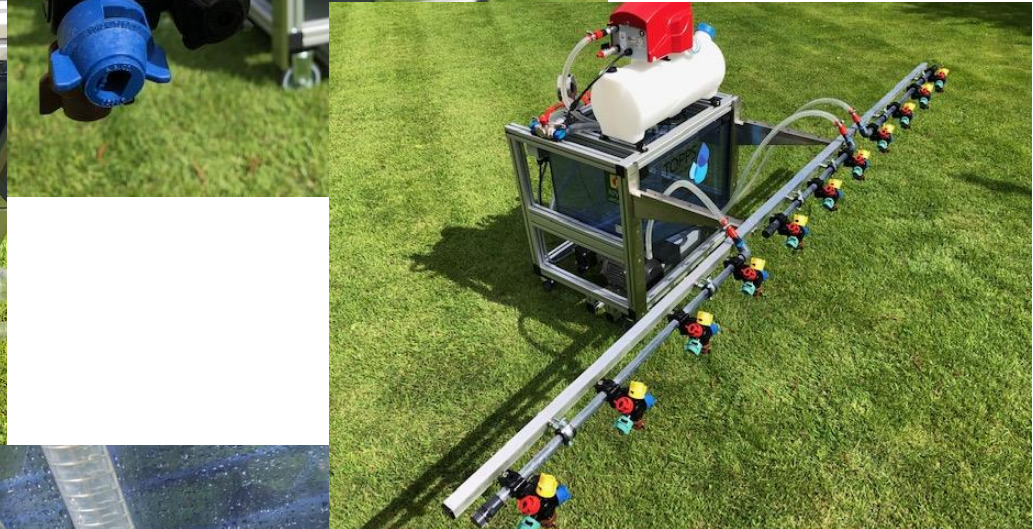
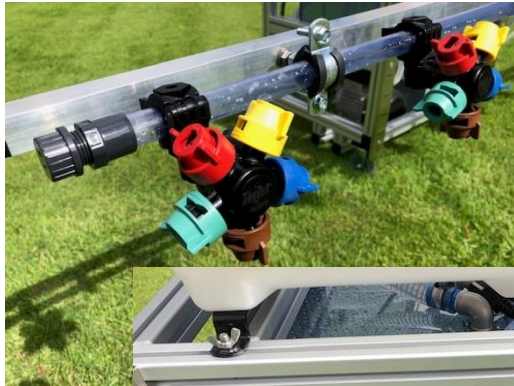
Herbicide Use in Grassland

Promoting best practice in the use of pesticides to protect drinking water



Printed Support Materials





Rush Control

PROTECT WATERWAYS FROM CONTAMINATION

- Farmers if you want to retain cost effective products for rush control – use MCPA products safely
- Do not use on waterlogged fields (if tyre marks are visible – the field is too wet)
- Do not exceed the maximum application rate (if you do you could cause water contamination / face a penalty).
- Keep spray 5 metres back from water courses (buffer zone)
- Do not use if rainfall is expected for 24 hours and only apply when growing conditions are good and on a calm day.
- Clean and wash down your sprayer at the end of the day, preferably in the field and certainly well away from water bodies or open drains.


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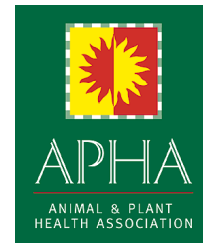
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Farmer Meetings



Monitoring 2018 - 2020

- Remedial Action List
 - 2018 – Nore, Feale, Deel and Loughforbes
 - Monitoring April – October
 - 55 Monitoring Points
 - Large Data Set – 1100 Recorded sampling events
 - Diagnostic Tool
 - Awareness raising
 - Farmer Interaction
 - BPM – Techniques
 - Progress



Thank You for Your Participation

Questions / Comments / Discussion