

Reduction of Plant Protection Products (PPP) losses to water through **environmentally **o**ptimized **s**prayers (EOS – project)**

XIV Symposium Pesticide Chemistry- Env. Fate and Ecol. Effects
30th August /1st September, Piacenza, Italy

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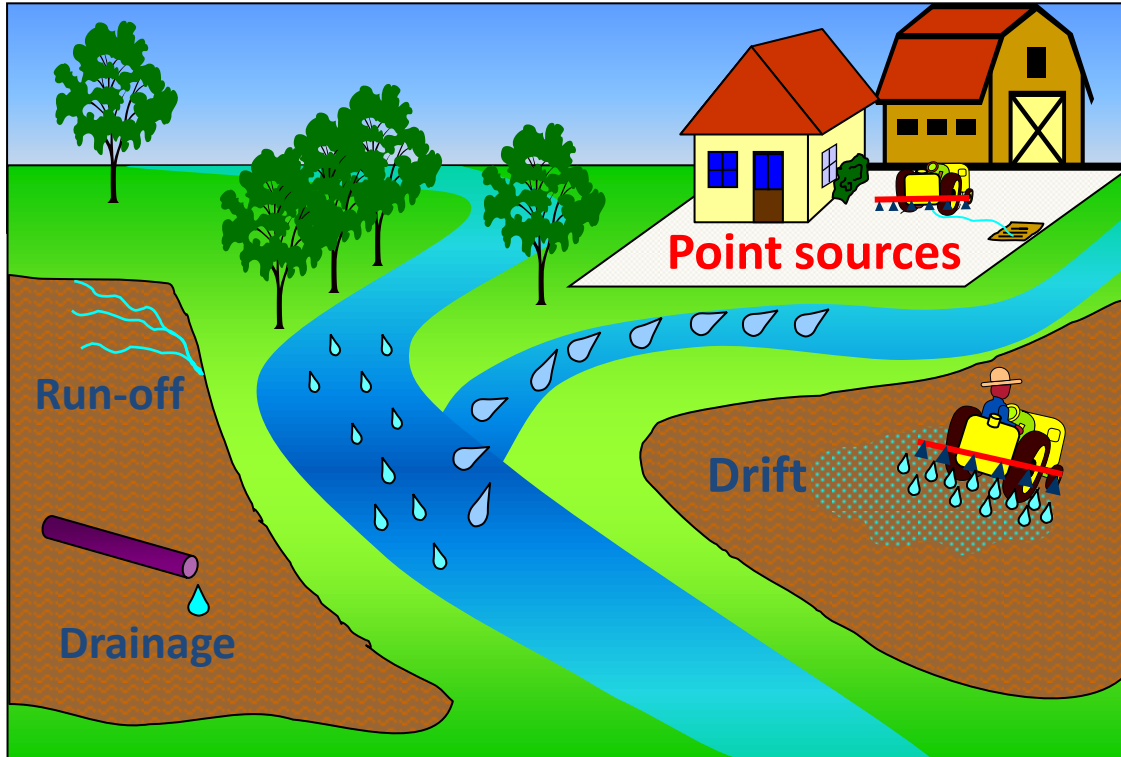
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Content

- 💧 Introduction
 - 💧 Technical measures and their efficiency (TOPPS-Stakeholder survey 2006)
 - 💧 EOS – objectives and execution of project
 - 💧 Evaluation steps
 - 💧 EOS – evaluation tool
 - 💧 Who should use EOS materials and how should it be used
 - 💧 Short demonstration
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Two main PPP entry routes into surface water:



5 %
Drift
30 %
Run-off

Diffuse
source can
be reduced

> 50 %
Point
Sources

Point source
can be
avoided

Clear definition is necessary because the mitigation measures are different

Mitigation of PPP losses to water need to be organised along the Crop Protection Process

PPP

Application techniques

Infrastructure

**Correct
Behaviour
Operator**

EOS – Project evaluate mitigation potential of application techniques
Fieldsprayers / Orchard-Vine sprayers

- European Experts (9)
- Sprayer manufacturer (3)
- Crop protection industry (4)

EOS is a European project supported by ECPA (European Crop Protection Ass.)

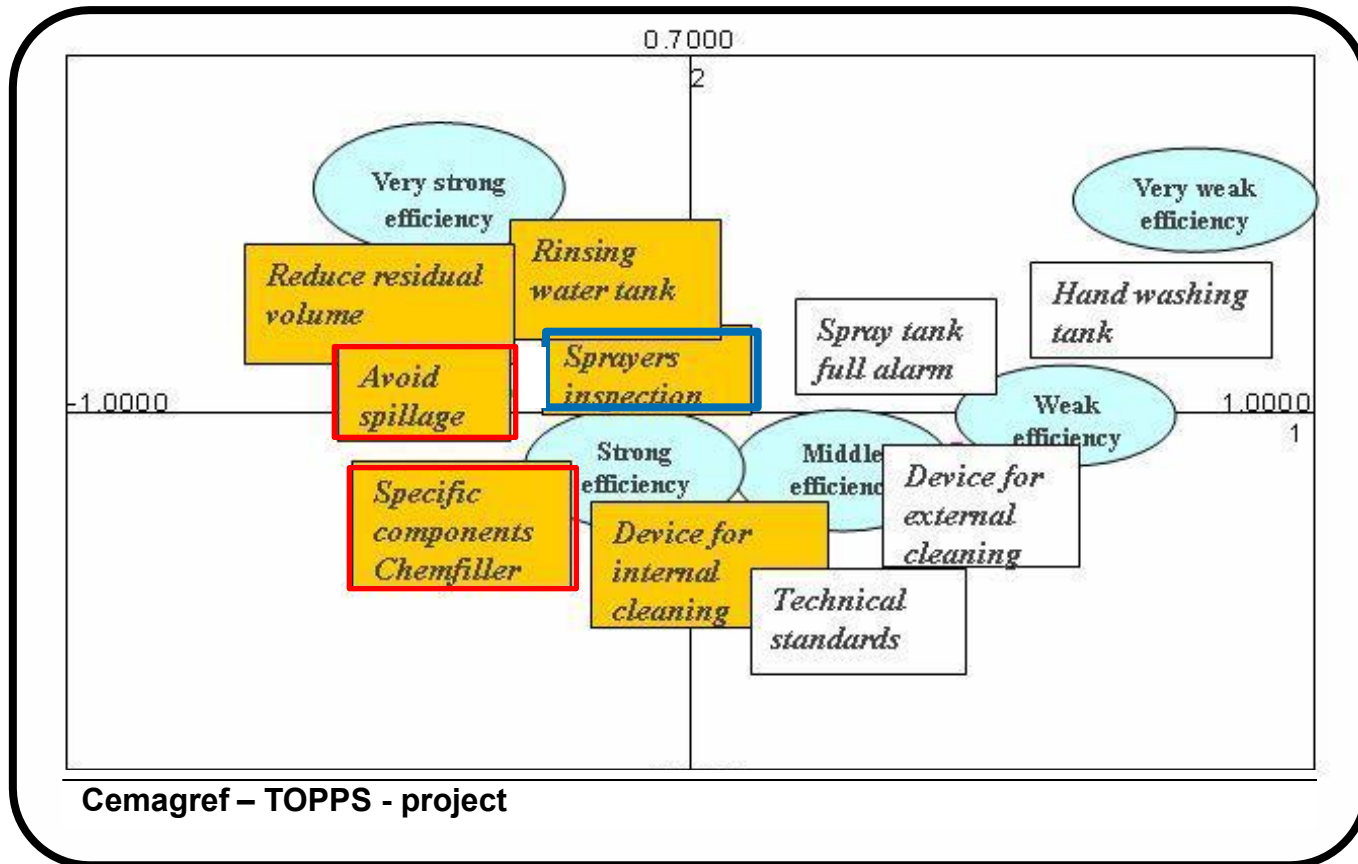
Objective of EOS – Project

Create awareness

Stimulate improvements

Support improvements

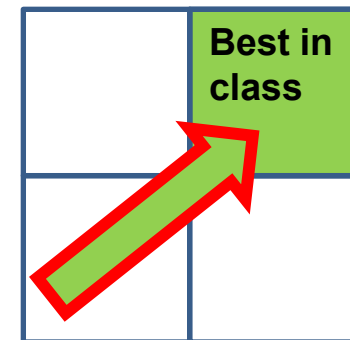
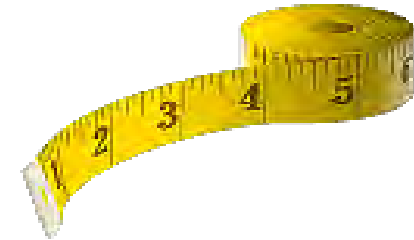
Mapping of equipment / measures according to their point source risk mitigation efficiency



Stakeholder Survey 2006 (TOPPS project; 10 EU countries n = 600)

EOS – what has been done !

- Analysis of risk areas and weighting of their significance?
- Evaluation of technical problems and available technical solutions (194) ; weighting and scoring risk mitigation capabilities (mitigation score 1 to 10) for field crop- and orchard sprayers
- Evaluation of Sprayers by combining risk analysis and technical mitigation capabilities (EOS – index).



EOS - index

EOS – projekt: Risk areas and their significance : step 1

EOS - Risk area	Field sprayer %	Orchard/Vine Sprayer %
Inside contamination	45	35
Outside contamination	10	20
Filling	20	20
Remnant - Management	15	10
Drift and Spray losses	10	15
Total	100	100

FOCUS IS ON 5 RISK AREAS

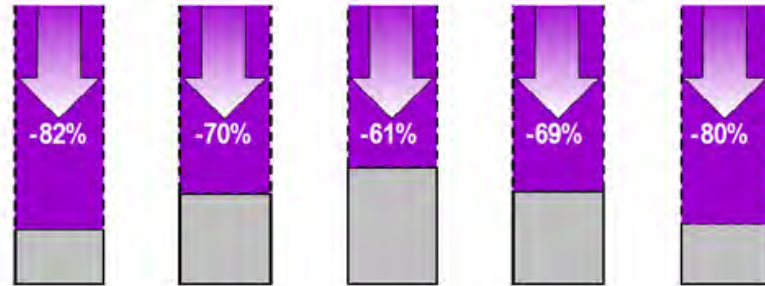
Evaluation based on studies + Expert judgements

Correct management of inside contamination most important mitigation measure

Technical features /aspects to properly clean field sprayers is key

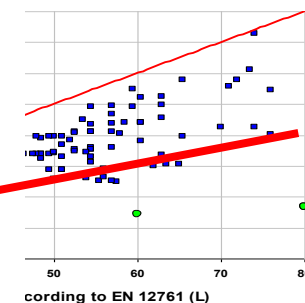
- **Reduce technical residual volume** (design, optimize dimension of booms and pipes)
- **Rinse tank** for in field cleaning
- **Internal cleaning system**
- **Smooth tank wall structures**
- **Outside cleaning device** to clean in field
(Deposits can be high in Orchard sprayers)

Rel. reduction of PPP pollution in 5 catchments sewage plants



Point source reduction if cleaning in field (5 catchment studies ; Univ. Giessen)

According to test reports compared to the European Standard EN 12761 was used due to missing data



Standard

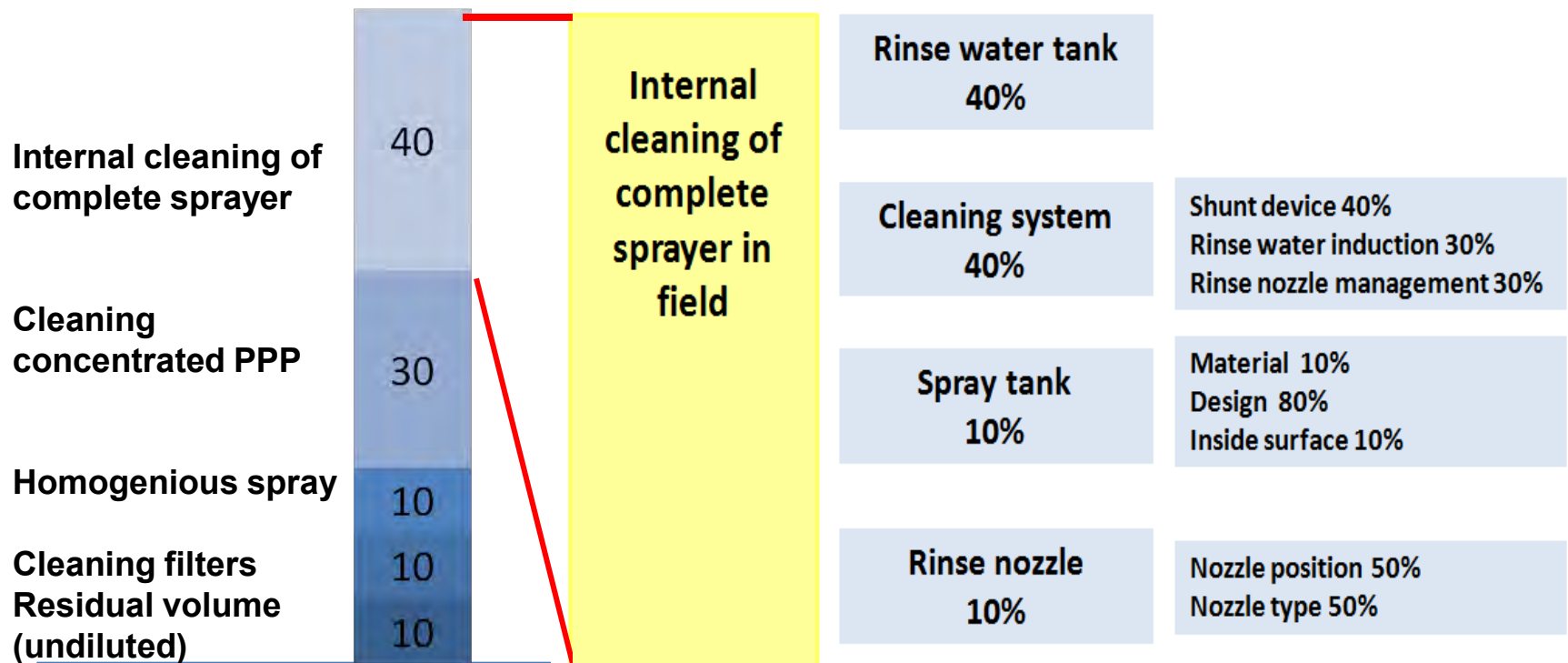
Best in class

Best sprayer have 50% less residual volume than Standard (ENTAM-tests – Debear et al 2008)

EOS – projekt: Technical problems and technologies: step 2 / 3
Example: Internal contamination field crop sprayer (45 %)

**Step 2
Problem
areas**

Step 3: Technologies and aspects



EOS – projekt: Technical solution: step 4

Example: Internal contamination field crop sprayer (45 %)

Problem

Technology

Technical solution - Mitigation score
(0 to 10)

Internal cleaning of complete sprayer in field	Rinse water tank 40%	Not available	0
	Cleaning system 40%		
Fieldsprayer 40% Orchard-sprayer 30%	Spray tank 10%	Undersized (not sufficient for complete internal cleaning in the field)	3
	Rinse nozzle 10%	Standard capacity (10% of nominal volume ect.)	8
		Oversized 20% above standard (to allow internal and external cleaning in the field)	10

EOS – Evaluation tool (1)

EOS – first screen

EOS

english
Guide
Field Sprayer
Handbook

Inside contamination 0 %
Outside contamination 0 %
Filling 0 %
Spray losses including drift 0 %
Remnants 0 %
Evaluation results 0 %

- ▶ Internal cleaning of complete sprayer in the field
- ▶ Cleaning of concentrated PPP
- ▶ Homogeneous spray liquid
- ▶ Cleaning filters
- ▶ Residual volume in hoses and pipes (not dilutable) ?

EOS – Risk areas

EOS – Problem areas

- Language selection (UK,FR,ES,DE,NL,SE,IT,DK,PL)
- User quick guide on how to use the tool
- Sprayer type selector Field / Orchard sprayer
- Handbook download : Documentation

EOS – Evaluation tool (1)

EOS – second screen

english
Guide
Orchard / Wine Sprayer
Handbook

Inside contamination 0 %
Outside contamination 0 %
Filling 0 %
Spray losses including drift 0 %
Remnants 0 %
Evaluation results 0 %

Internal cleaning of complete sprayer in the field
Cleaning of concentrated PPP
Homogeneous spray liquid

Agitation system

- No agitation system (just backflow)
- Poor agitation /residues on bottom of tank
- Agitation visually effective and no residues on tank bottom
- Agitation at standard
- Agitation above standard

Agitation intensity adjustment (regulation of agitation flow rate)

- No intensity adjustment
- Manual intensity adjustment
- Remote controlled intensity adjustment
- Automatic intensity adjustment (sensor+computer)

next >>

EOS – Problem areas

Technology
Technical
Solution
(Selection)



**Comment /
picture**



EOS – Evaluation result

EOS english ▾
Guide 📖
Orchard / Wine Sprayer ▾
Handbook 📖

Inside contamination 56.8 %	Outside contamination 68.1 %	Filling 64.3 %	Spray losses including drift 48 %	Remnants 43.6 %	Evaluation results 58 %
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Evaluation results

Inside contamination (35%)	56.8 %	★ ★ ★ ☆ ☆
Outside contamination (20%)	68.1 %	★ ★ ★ ☆ ☆
Filling (20%)	64.3 %	★ ★ ★ ☆ ☆
Spray losses including drift (15%)	48 %	★ ★ ☆ ☆ ☆
Remnants (10%)	43.6 %	★ ★ ☆ ☆ ☆
Total	58 %	★ ★ ★ ☆ ☆

- < 40 1 Star
- 40-54 2 Star
- 55-69 3 Star
- 70- 84 4 Star
- >85 5 Star

Who should use EOS ?

1. Spray manufacturers to focus development processes on environmental relevant factors and to profile their optimized products to their customers.

Focus Development + Marketing

2. EOS provides discussion platform for all stakeholders
Engineers, Crop protection experts, Advisers, Water- and
Landmanagers, Others

Focus Communication

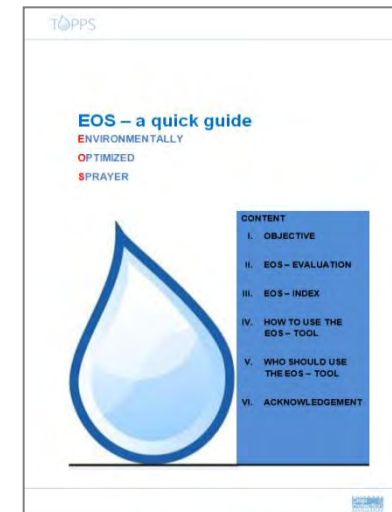
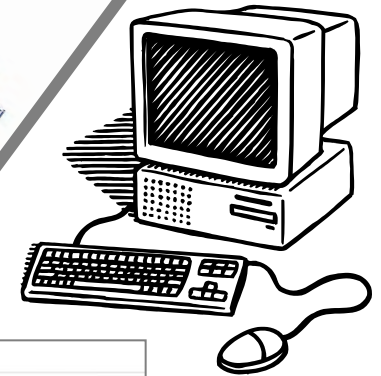
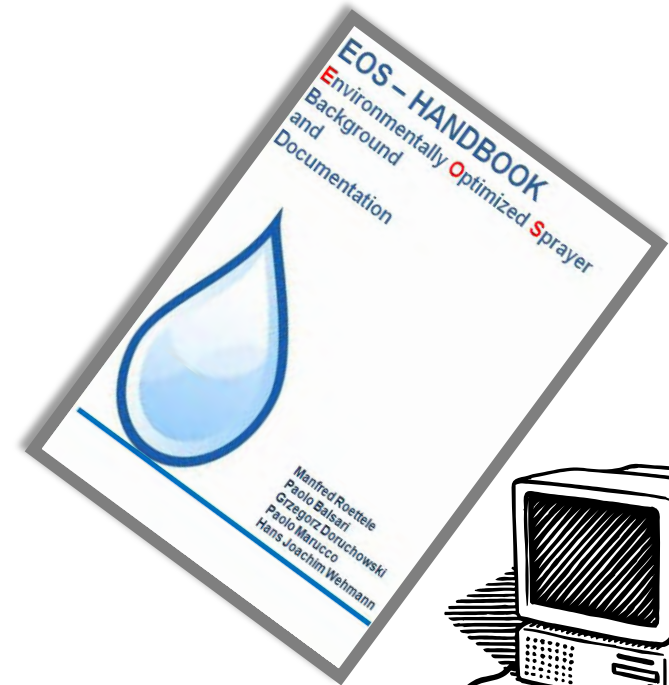
3. Create awareness for optimized equipment with Farmers,
Dealers and Advisers
EOS has been used for training and education

Focus Awareness

EOS – materials

How can you work with it ?

- EOS Handbook 100 pages with illustrations and pictures
Documentation + background
- EOS – Web based evaluation tool
(multilingual UK,FR,DE,ES,IT,PL,DK,
NL,SE
Pictures, Comments and references
to ISO /EN Standards
(also as offline version available)
- EOS – Quick guide on how to use the
evaluation tool



SHORT EOS tool Presentation

[Documentation Weblink: http://prototype.TOPPS-eos.org/](http://prototype.TOPPS-eos.org/)