Perceptions and practices in the context of remnants management
Results from the TOPPS - Project

- TOPPS -Project
- Perception of risks
- Practice / Considerations

Biobed-Workshop Ghent 11/12.December 2007

Manfred Röttele TOPPS project manager

Point sources: the underestimated entry route of PPP into water!

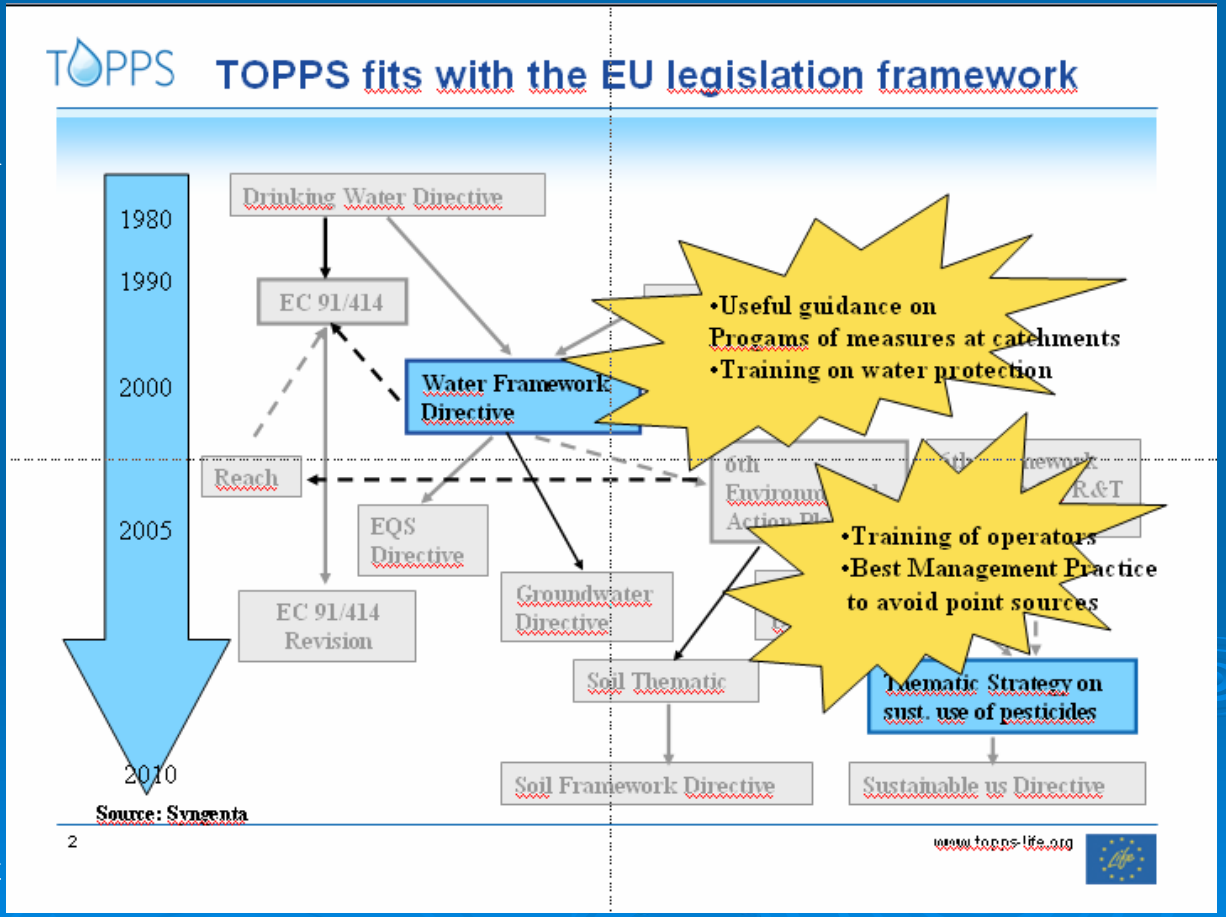
- Current available studies indicate point sources contribute **MORE THAN 50%** to PPP pollution of water
- Correct behaviour, improvements of technique and infrastructure can avoid point sources and reduce findings in water

Topps fit within EU strategic initiatives

TOPPS is a 3-year, multi-stakeholder project covering 15 European Countries - it stands for Training the Operators to prevent Pollution from Point Sources which began 1st November 2005, and ends 30th October 2008.

TOPPS is funded under the European Commission's Life program and by ECPA, the European Crop Protection Association.

TOPPS is aimed at identifying Best Management Practices and disseminating them through advice, training and demonstrations at a larger co-ordinated scale in Europe with the intention of reducing losses of plant protection products to water



TOPPS – PROJECT STEPS

Completed

Inventory

Materials
Experts
Database

Common

Best
Management
Practice

Awareness Surveys

Stakeholders

Farmers

Ongoing

Dissemination

Farmers
Advicers
Stakeholders

Upscaling / Proposal

Gaps
Riskmanagement
Measures

Risk perception by working process

- **Stakeholders**
- **Farmers**
  (Examples FRA, DEU, ITA)

Point sources risk assessment based on stakeholder survey (1) by working process (ratings 5 important .. 1 not important)

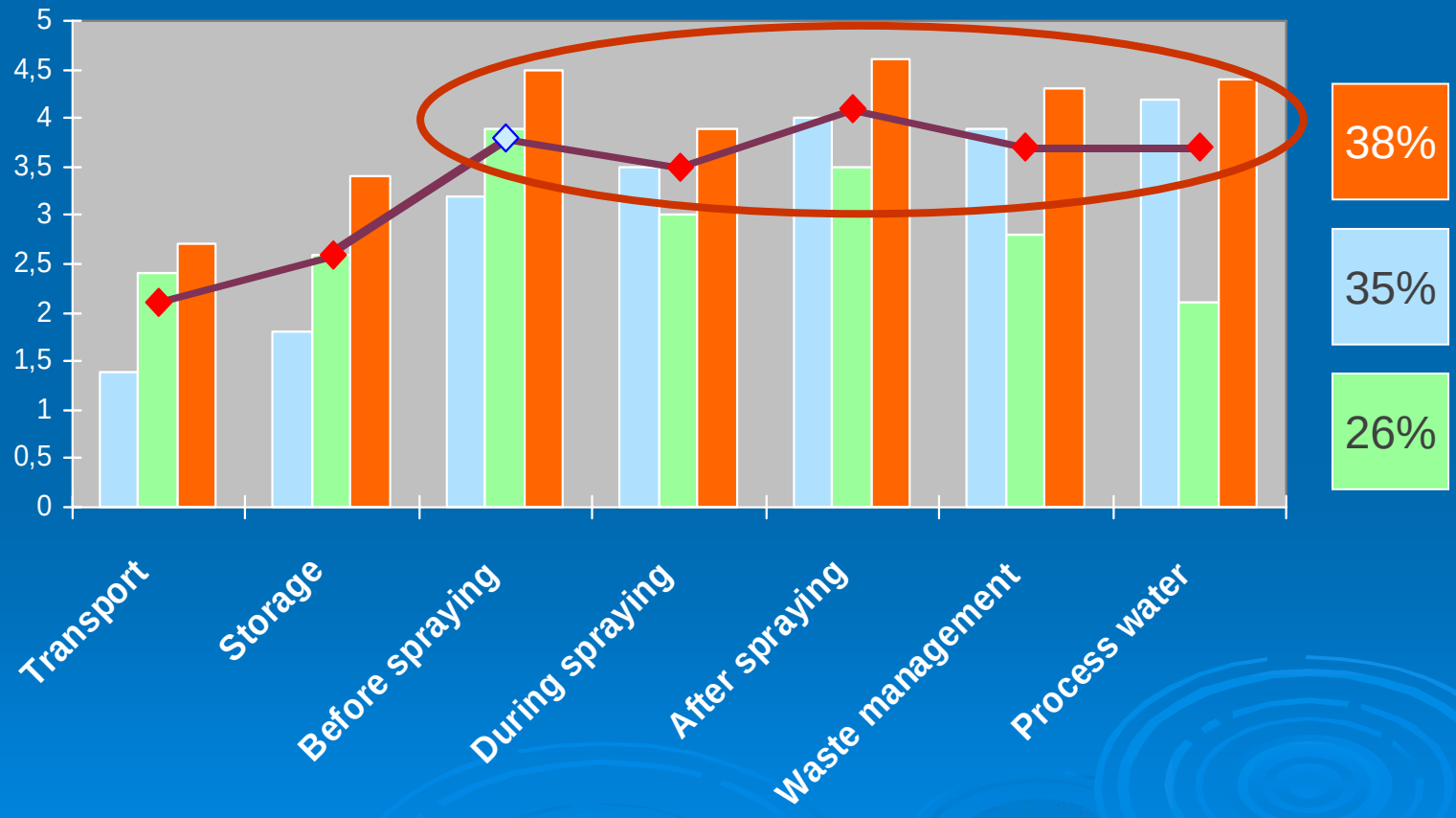
Rate each of the listed processes according to the potential in reducing ppp point sources (Rate 5= very effective – 1 = not very effective (average in regions)					
Region	MW	East	Nordic	South	France
After spraying	4,1	3,1	3,9	4,3	4,1
Before spraying	4,1	3,4	3,6	3,6	3,8
Waste management	3,6	3,5	4,5	4,3	3,2
Process water	2,9	3,3	4,3	3,6	4,2
During spraying	3,4	3,2	3,6	3,8	3,5
Storage	2,4	3,6	2,3	2,3	2,7
Transport	2,1	3,2	1,9	2,0	2,1

- **The storage aspects is seen in the East much more important than in the other regions**
- **Waste management and process water is seen most important in the Nordic**
- **After and before spraying seen most important in UK and BE the waste management aspect is perceived less important**
- **French results highlight the significance of the process water aspect (Remnant management) and after spraying**

Q 16

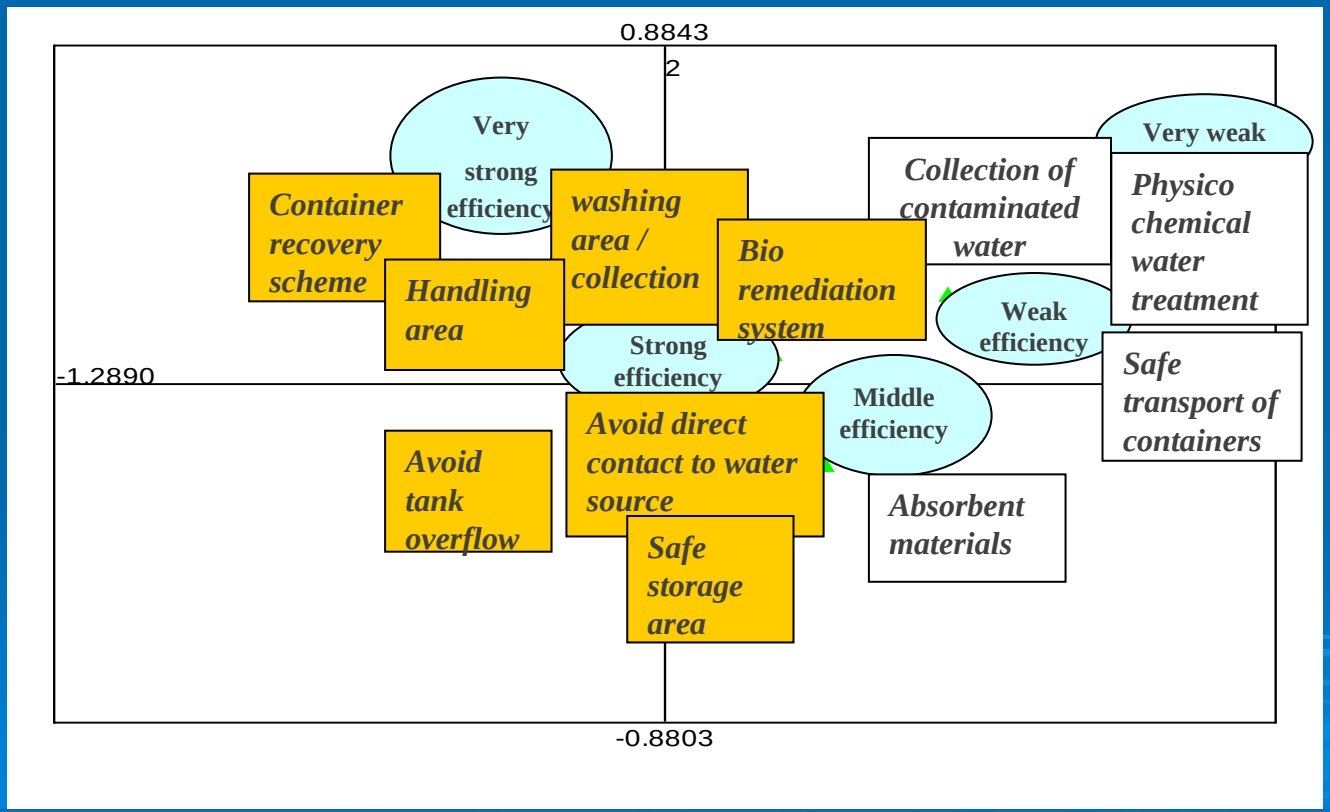
Point sources risk assessment based on stakeholder survey (2)
Cluster analysis (ratings 5=important.. 1 not important)

Stakeholders are evaluating the risks for point sources similar among clusters by working process (except for process water) n=600



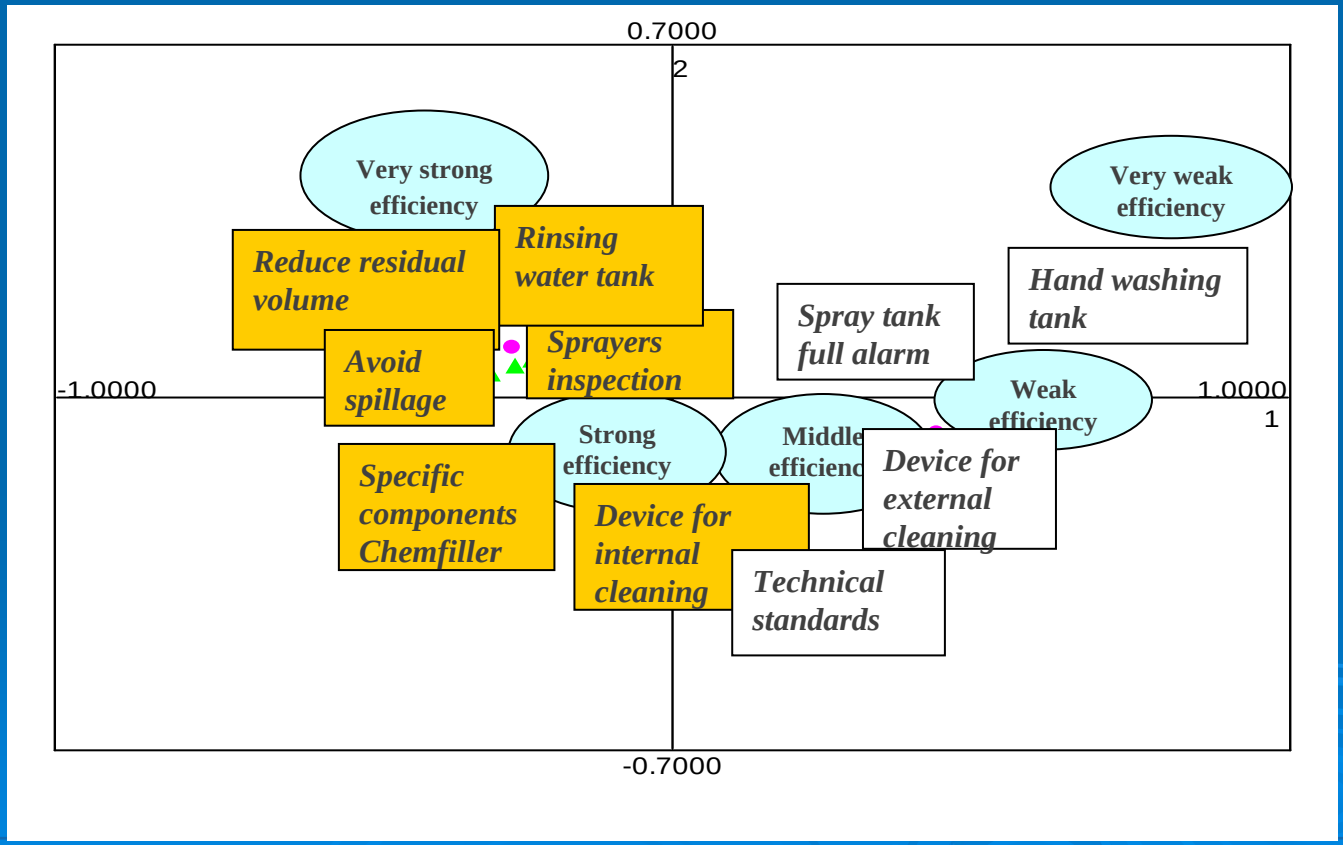
Stakeholder surveys (3)

What do you think is the best infrastructure approach to reduce PPP from point sources? (Perception map)



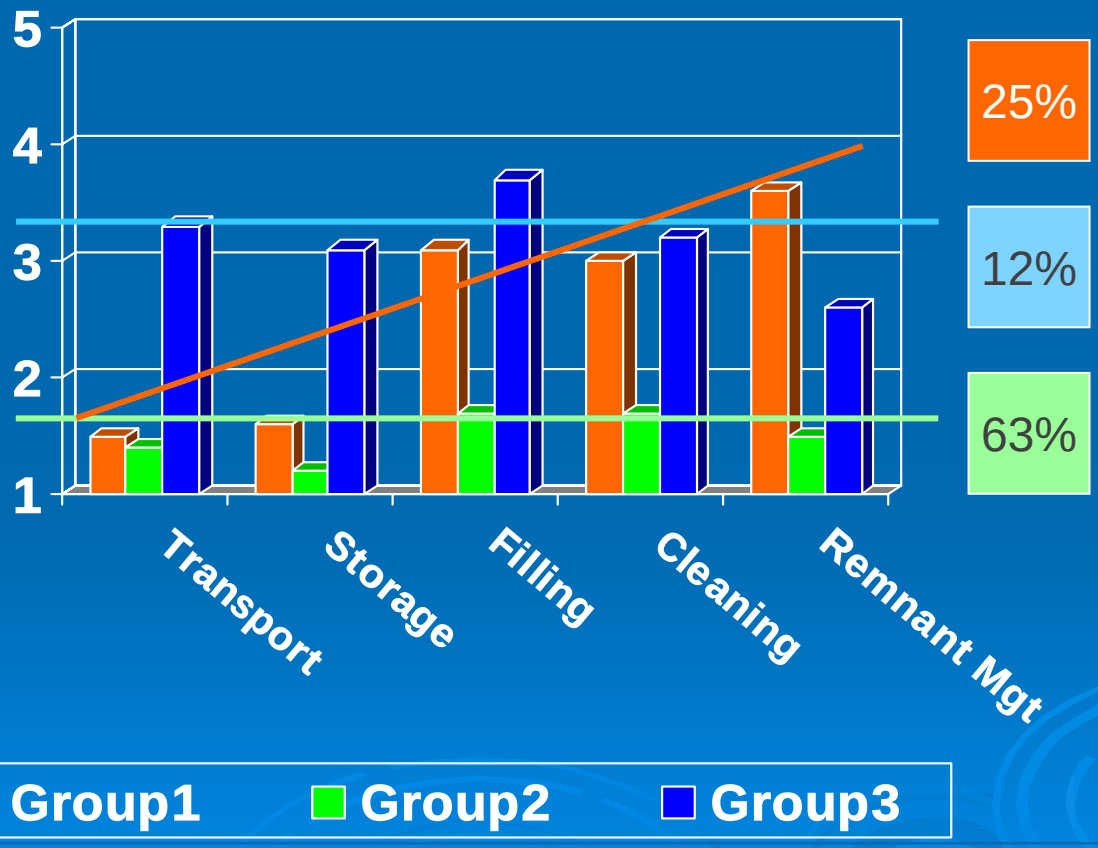
Stakeholder surveys(4)

What do you think is the best technical approach to reduce PPP from point sources? (Perception map)



Farmers – surveys (1) Clusteranalysis
Ratings: 5= important ... 1= not important

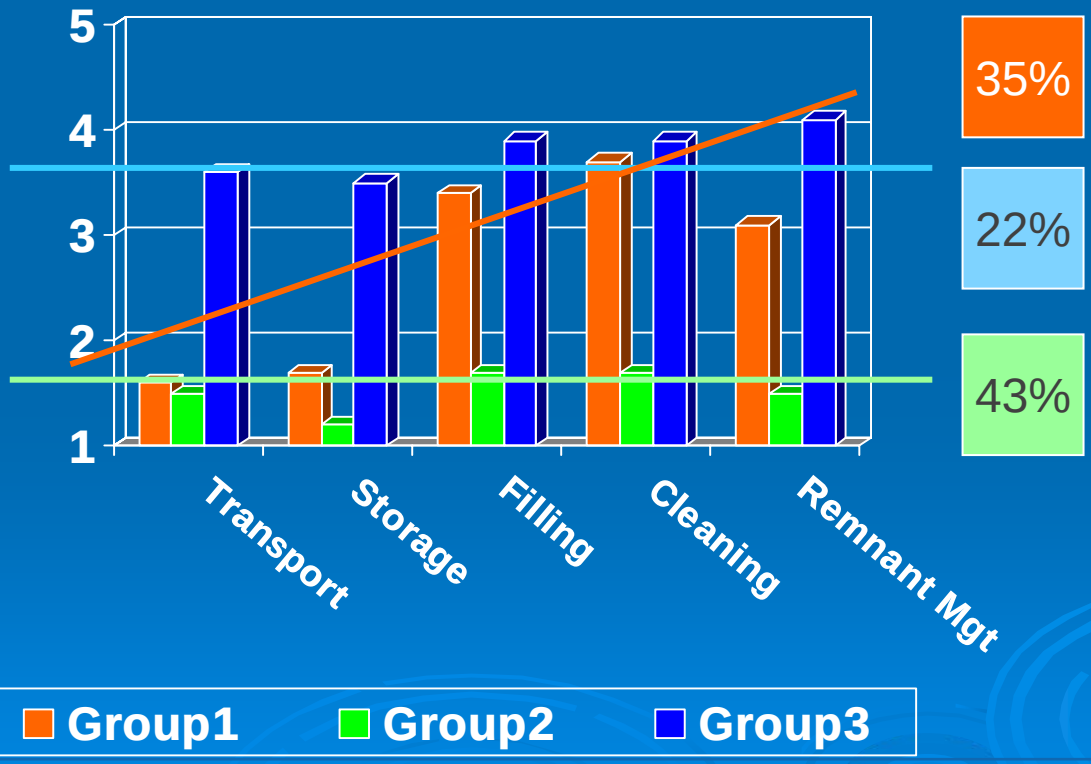
Awareness is not homogeneous
(Example: French study n=152)



Remnant management = waste mgt + process water

Farmers – surveys (2) Clusteranalysis
Ratings: 5= important ... 1= not important

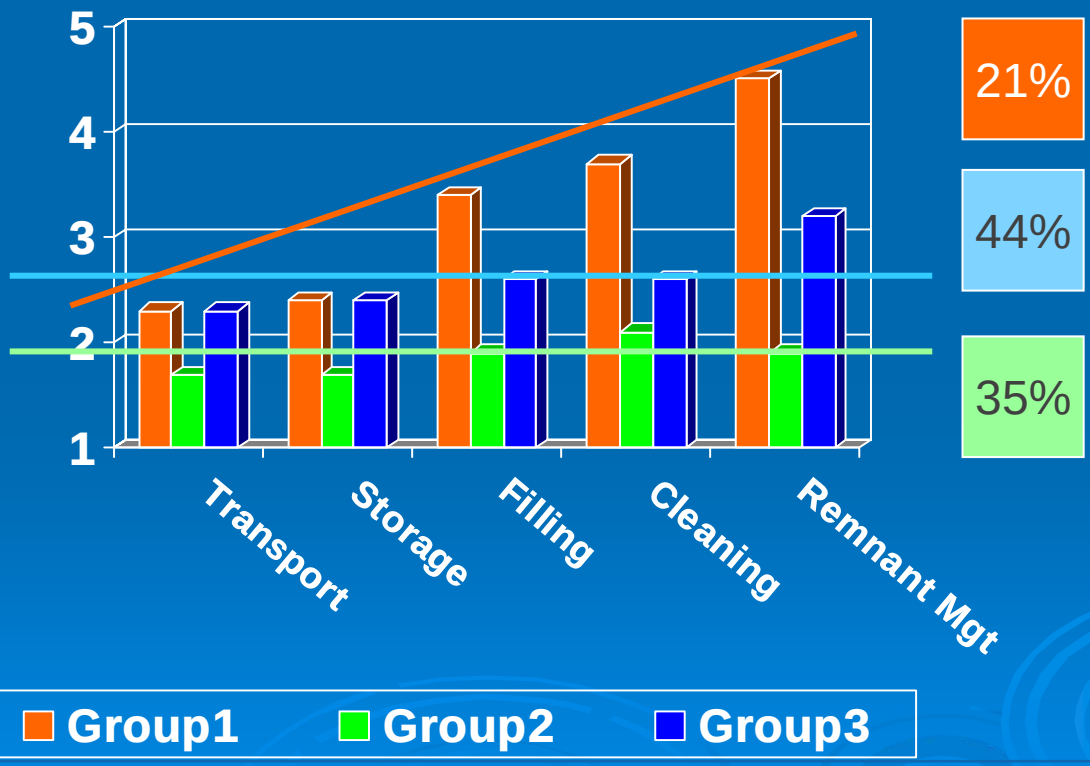
Awareness is not homogeneous
(Example: German study n=157)



Remnant management = waste mgt + process water

Farmers – surveys (3) Clusteranalysis
Ratings: 5= important ... 1= not important

Awareness is not homogeneous
(Example: Italian study n=200)



Remnant management = waste mgt + process water

Risk perception of point sources by working processes

- Stakeholders evaluate point source risks rather consistent / some regional differences are obvious
- About 20 to 35% of Farmers are evaluating point source risk specific by working processes
- 65 to 80% of the farmers are not differenciating between working processes

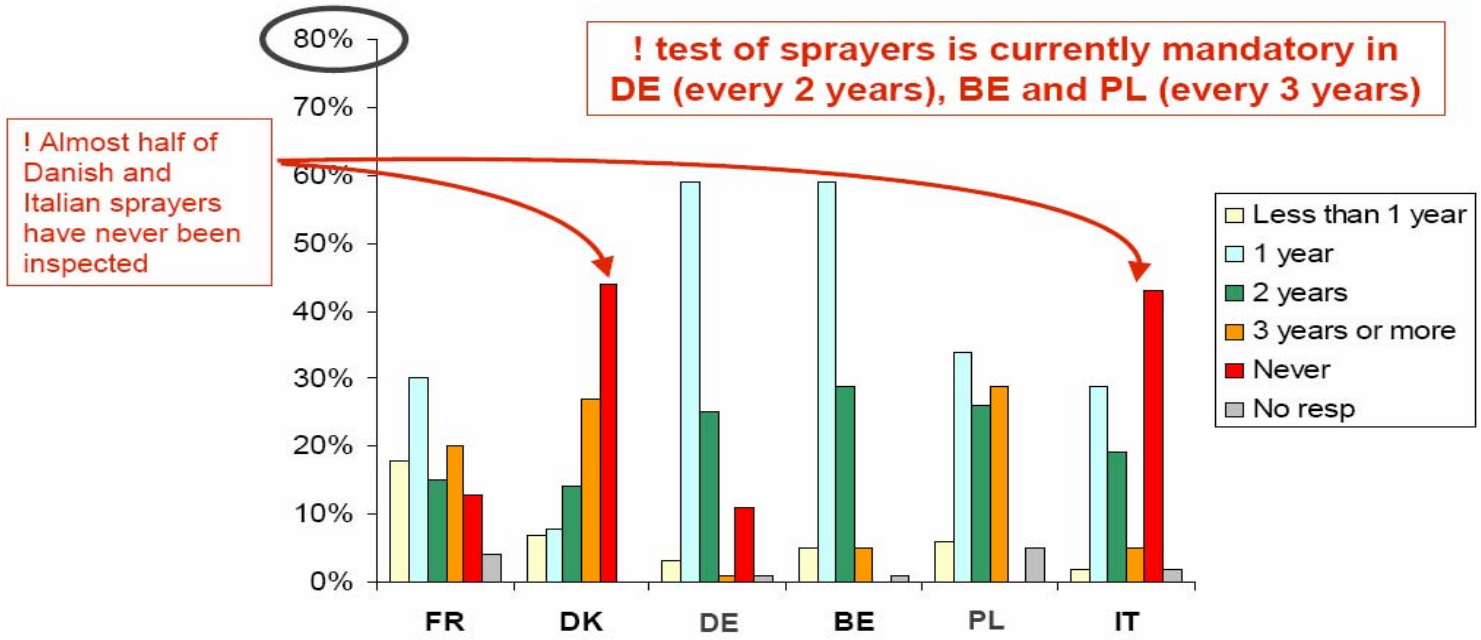
Practice / Considerations

- Sprayertesting and calibration
- Filling
- Residual volumes
- Definitions and Standards
- Cleaning

....when was your sprayer last inspected by an external person ?

Characteristics of Boom/Fieldsprayers

- **Inspection's date of Boom / Fieldsprayers (Q8.1):**



Before spraying: How farmers measure water volumes

Orchard / Vine sprayers Italy
(Fieldsprayers Germany)

93 % measure with the scale at the spray tank (83%)

6% measure according to own marks at the spray tank (6%)

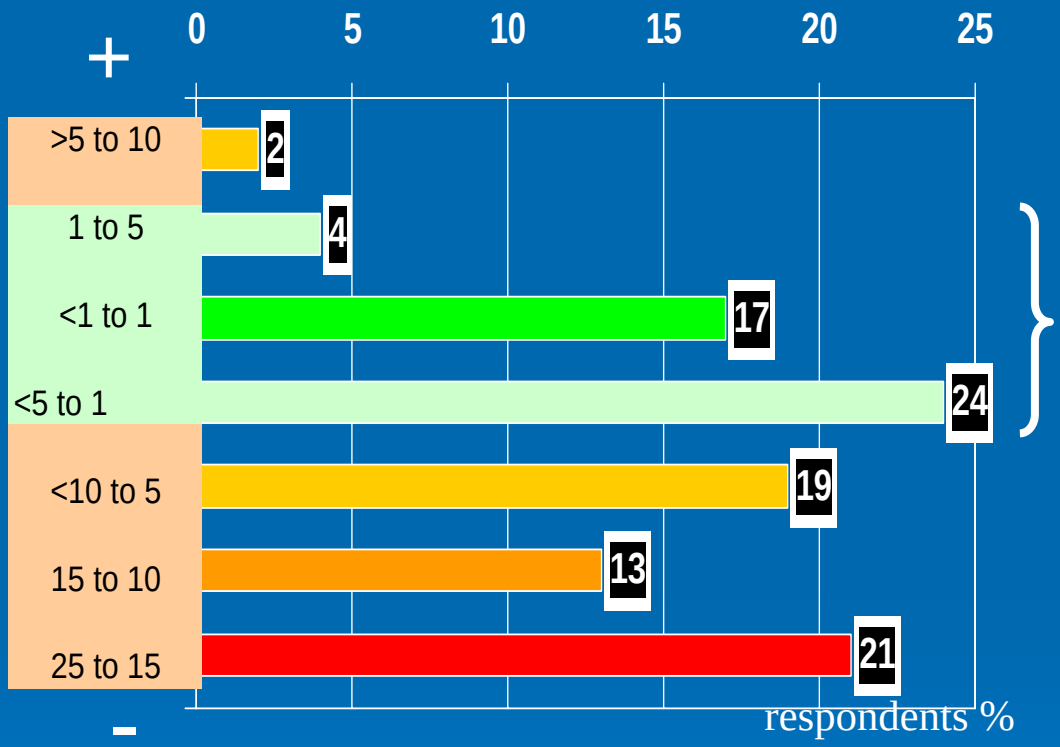
1% measure with a flow meter (10%)

Topps Farmer Survey Italy /Germany 2007 Orchard/Vine sprayers Italy (n= 141)
Fieldsprayers Germany (N=157)

Source: TOPPS farmer surveys

Before spraying: How accurate are the measurements

Tank filling error % (which margin of error can be tolerated ?)



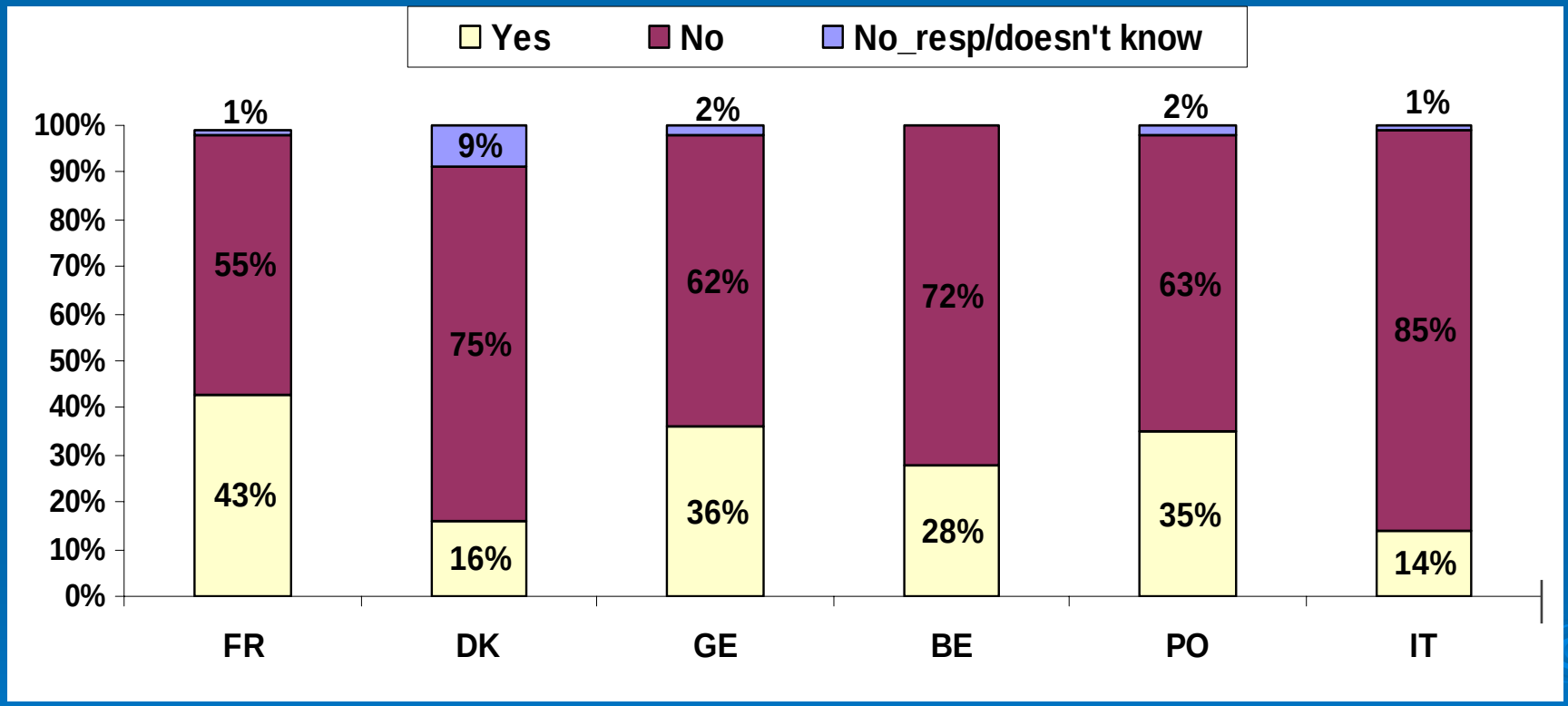
Tank content gauges poorly precise and not readable
(DEIAFA survey on orchard sprayers in Piemonte region)
pers. communication: Prof P. Balsari Univ. Turin

Could flow meters improve the level of precision ?

- More precise calibration
- Less tank overflow (automatic shutter)
- Less need to take reserves

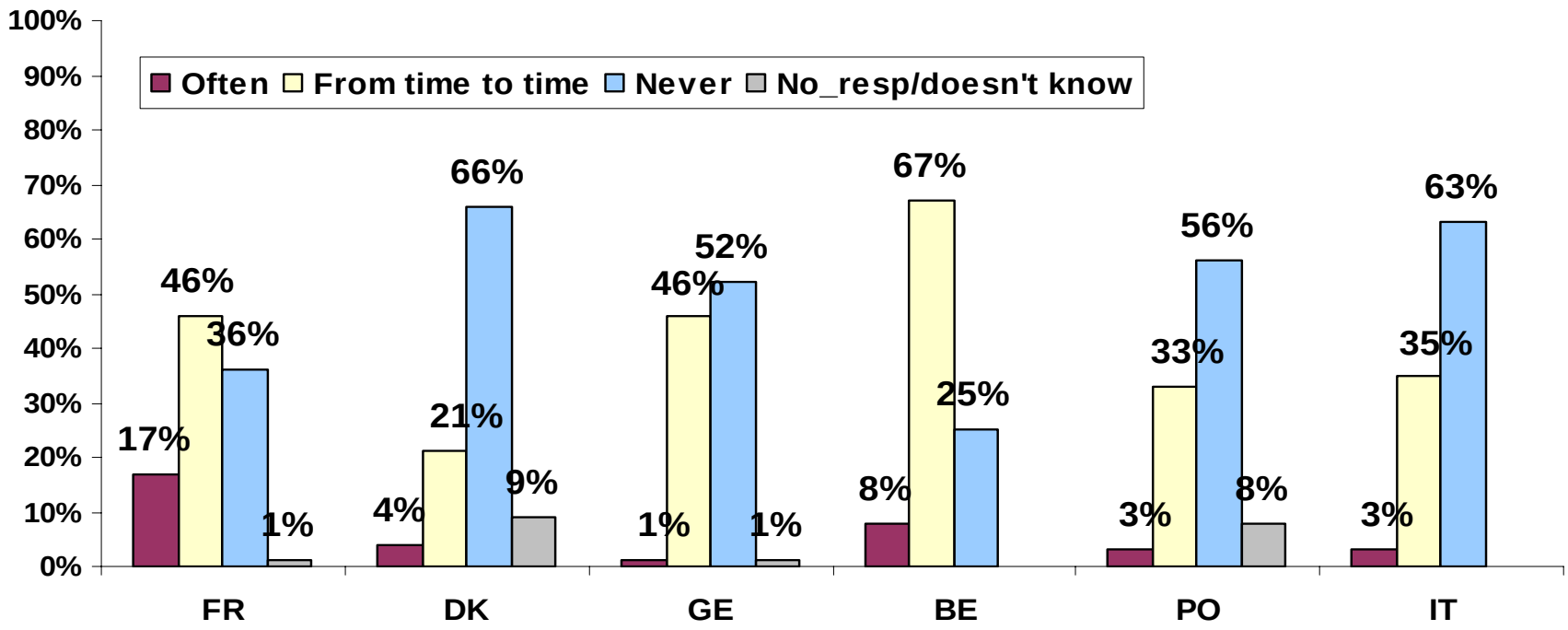
(Investment:100 to 1000 €)

Addition of about 5 to 10% more water to ensure to have enough spray liquid available (Reserve)



Improved technology will not require additional „safety“ volume to carry

How often do you have left overs in the sprayer ?



Left over spray was probably not understood in all studies in the same way
Clear definitions and communication is needed

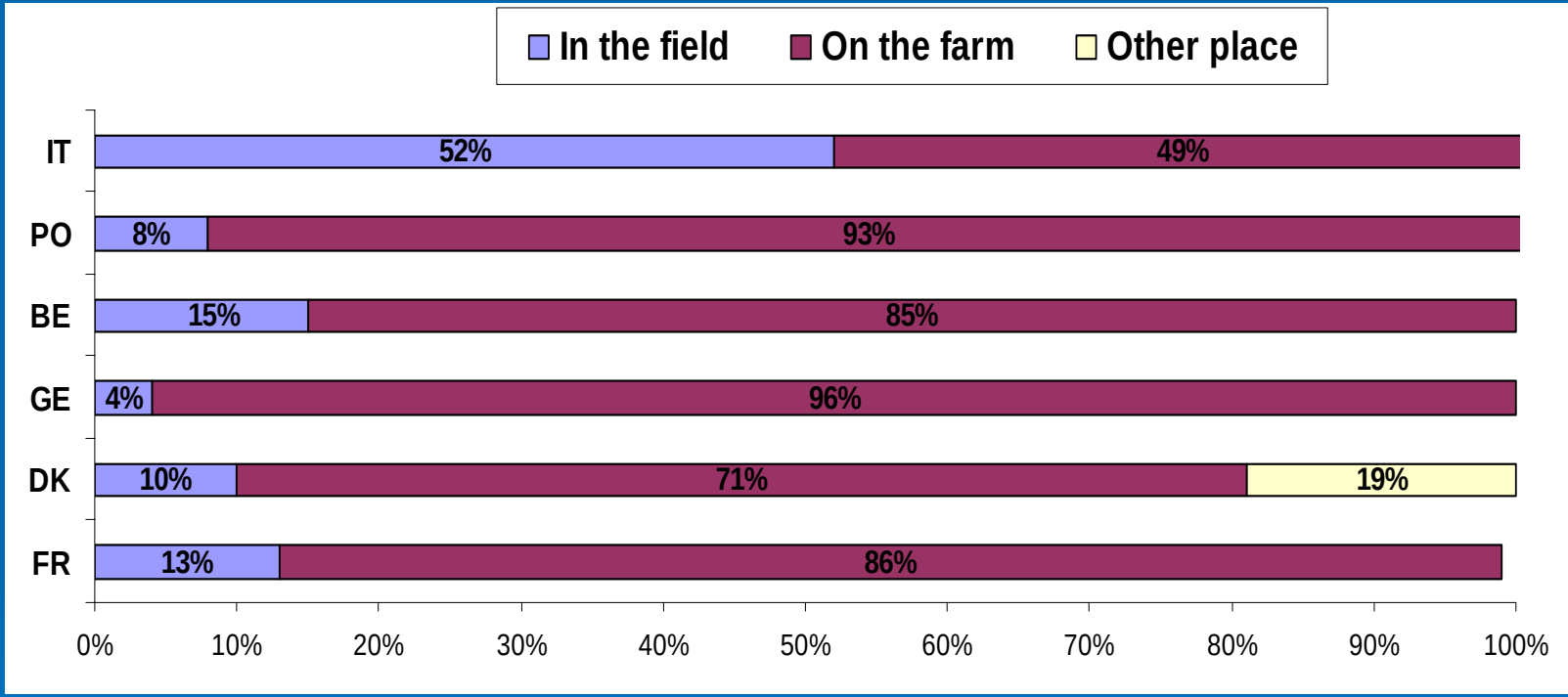
To avoid pollution from point sources starts

with thorough planning and the correct calibration of the sprayer !!!

- Fill correct volume in sprayer
- Apply the needed volume
- End up with no left over spray

- Rinse sprayer after spraying in the field and spray out contaminated liquid as much as possible
- Bring least possible volume of contaminated liquid back to the farm

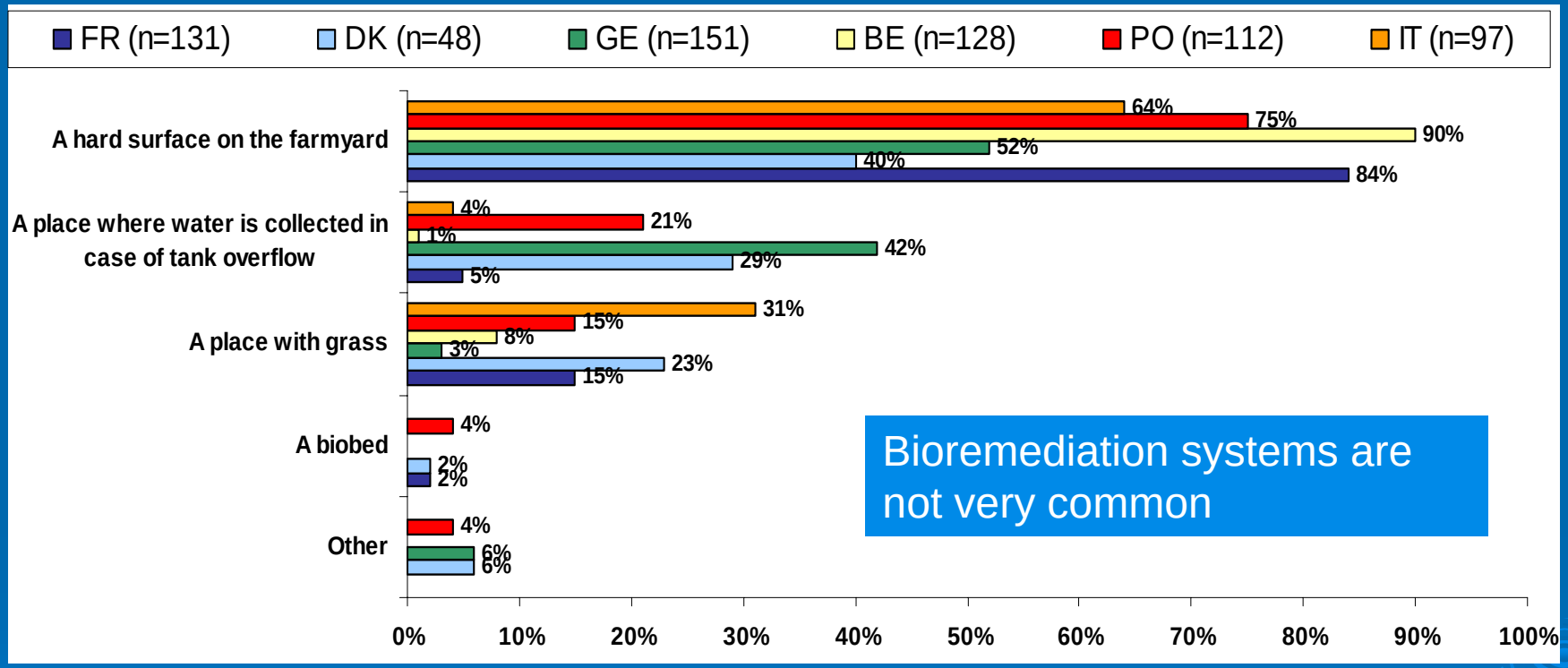
Place where the sprayer is filled with PPP



majority of farmers fill their sprayer with PPP on the farm – except in Italy where half of them manage the filling in the field (water sources used in the field)

(Filling place is mostly also the cleaning place)

Place on farm where the sprayer is filled with PPP

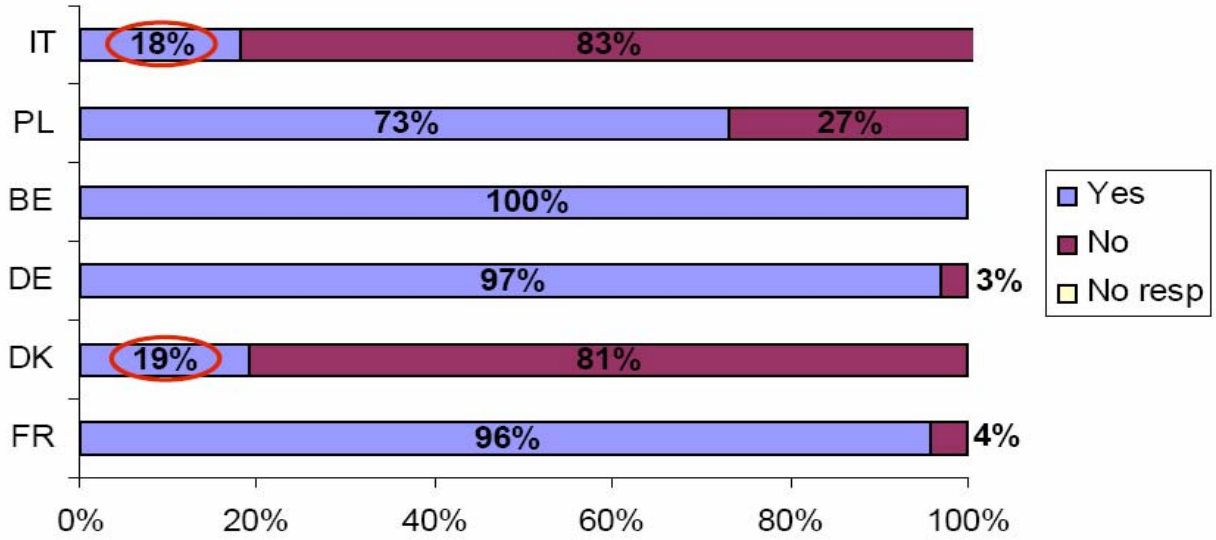


Bioremediation systems are not very common

Majority fill sprayers on farmyard where water is not specifically collected

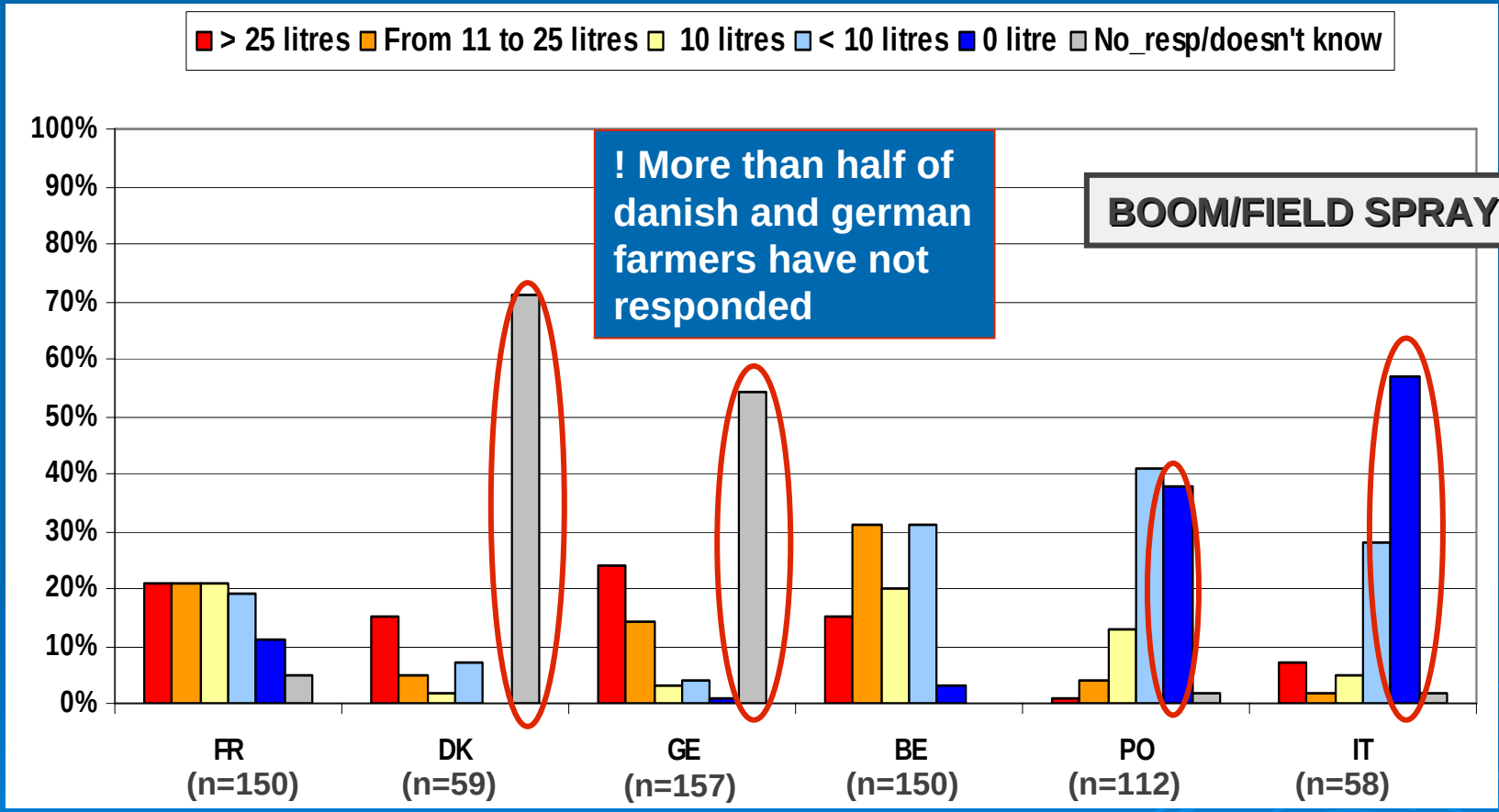
Management of empty containers

- **Do you rinse your empty containers ? (Q23a):**



Except in Denmark and Italy, a great majority of farmers rinse their empty containers

Volume of spray liquid which remains in the boom/field sprayer after application?

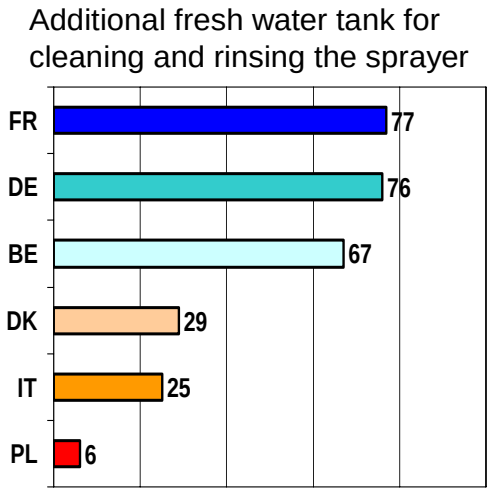


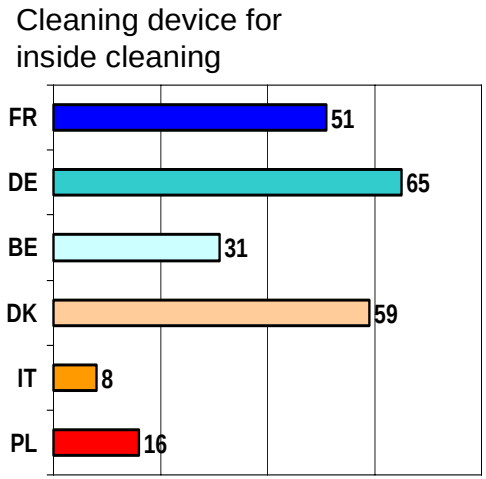
Awareness on residual volumes very variable – Terms may be unclear and misunderstood in the surveys

TOPPS Farmer survey in pilot catchments areas 2007 – Analysed by Cemagref

Farmaudits – technical / infrastructure status

Technical / Infrastructure audits in 6 pilot areas FR;BE;DE;DK;PL;IT (Aquasite , questionnaires)





Farmer surveys - Catchments

Technique and Infrastructure are enablers to comply with

BMPs and to avoid pollution

Definitions of „empty sprayer“ differ by focus

Total residual volume
Spray mixture which remains in the sprayer, which cannot be delivered with the intended application rate
Indicater: 25% drop of preasure shown at manometer

→ 1. Definition of empty sprayer (EN12761)
Focus is on **application**

Total residual volume
Spray mixture out until there is not any liquid coming out of the nozzles
(shut off circulation .- check manufacturer instructions?)
Indicater: nozzles blow air

→ 2. Definition of empty sprayer (ISO22368)
Focus is on **cleaning**

.... Are these definitions sufficiently known ?

PPP highly regulated – application not

Technical standards for sprayers are not demanding enough and not enforced in EU

Fieldsprayers

Total residual volume in l (EN 12761-2)				
Tank		Boom		
Tank volume	0, 5 %	length m	2l / m	Total litres
800	4	15	30	34
3000	15	21	42	57
4200	21	36	72	93

If the cleaning is not done properly some of these residual volumes may end up in the water

Regulations for PPP high – for Application technology hardly existing

- Rinse tank not yet obligatory in EU
- EU standards on sprayers are recommendations today

Inside cleaning depends on the cropping pattern on the farm (phytotoxicity) and the regulations for the products applied.

BMPs recommend to reuse remaining spray if possible and to clean inside only if required

	Italy	Germany	France
	Orchard/Vine	Field crops	Field crops
Number of inside cleanings of the sprayer per season	7,6	7,5	10,6
Number of outside cleanings of sprayers per season	7	4,7	2,8

Practice / Considerations (1)

- Sprayertesting is very variable in EU. Requirements are not the same
- Good calibration of sprayers are key to prevent point sources pollution. Technical status could be improved
- Cleaning of empty containers seems not everywhere receiving the same attention. Technical solutions could improve the situation. Cleaning of empty containers is especially important as concentrates are concerned
- Filling operations are mainly done on farm. Precautionary measures to prevent spills or overflow reaching surface water are needed
- Awareness on residual volumes in the sprayer after termination of spraying is widely varying. Information through advice and sprayer manufacturers is needed. Terms need to be clarified and communicated

Practice / Considerations (2)

- Current standards on residual sprayer volumes are not demanding enough and not enforced. Sprayers with low residual volumes should be promoted.
- Cleaning procedures of sprayers need to be disseminated and explained to farmers
- Correct behaviour is the **KEY** to avoid point sources .Optimized technique and infrastructure are the enablers
- Bioremediation systems could be an additonal element for the management of diluted, contaminated liquides and spills. In the TOPPS project Bioremediation systems (Biobed / Biofilter) are installed on most demo farms (9)

THE TARGET OF ZERO POINT SOURCE POLLUTION IS ACHIEVABLE

Cooperation between 12 Partners and 9 Subcontractors

TOPPS-Partners

European Crop Protection Association (ECPA)
6, E. Van Nieuwenhuyselaan
1160 Brussels, Belgium
www.ecpa.be

Harper Adams University College
Egmond
TF108NB Newport, Shropshire
United Kingdom
www.harper-adams.ac.uk

PC fruit
Fruittuinweg1
3800 Sint Truiden
Belgium
www.pcfruit.be

Research Inst. of Pomology and Floriculture
Pomologiczna 18
Skierniewice
Poland
www.insad.pl

Danish Agricultural Advisory Service, National Centre DAAS
Udkaersvej 15
Aarhus N, Denmark
www.landscentret.dk

Institute for Land Reclamation and Grassland Farming IMUZ
Falenty-Aleja Hrabska 3
Raszyn
www.imuz.edu.pl

Università di Torino – Dipartimento di Economia e Ingeneria Agraria Forestale e Ambientale DEIAFA
Via Leonardo da Vinci 44
10095 Grugliasco (TO), Italy
www.agraria.unito.it

Universitat Politècnica de Catalunya – Consorci Escola Industrial de Barcelona CEIB
08036 Barcelona
Spain
www.esab.upc.es

Provinciaal Onderzoeks- en Voorlichtingscentrum voor Land- en Tuinbouw POVLT
Iesperweg 87
8800 Rumbeke
Belgium
www.povlt.be

Centre National du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts CEMAGREF
361, Rue Jean François Breton
Montpellier CEDEX
France
www.cemagref.fr

+ 9 subcontractors

Arvalis – Institut du Végétal
Station d'expérimentation
91720 Boigneville
France
www.arvalisinstitutduvegetal.fr

Landwirtschafts-kammer Nordrhein-Westfalen
Nevinghoff 40
48147 Münster
Germany
www.lk-wl.de

Thanks for your attention