TOPPS project – what was done and learned

(Demonstartion project)

Manfred Roettele
TOPPS Project Manager

Train Operators to Prevent Point Sources

Content of the presentation

1.TOPPS – PROJECT

- Objectives
- Tasks
- Participants

2. Point source definition, significance and perceptions

- Point source significance
- Perception of point sources

3. KEY RISK AREAS (BMPS)

- Cleaning inside / outside
- Filling
- Remnant management

4. Technical and organisational needs to support mitigation

5. What TOPPS delivers

- BMPs as EU reference
- BMPs information , training materials, demonstartion
- Website: Point source information platform

6. TOPPS-lessons learned

7. Outlook

TOPPS – PROJECT – Funded by EU- LIFE and ECPA

Objectives:

•Common BMPs (stewardship+ risk mitigation)

- Training / Demonstration materials
- Dissemination of BMPs
- Proposal for a sustainable strategy to avoid point sources

TOPPS fits with the EU legislative framework

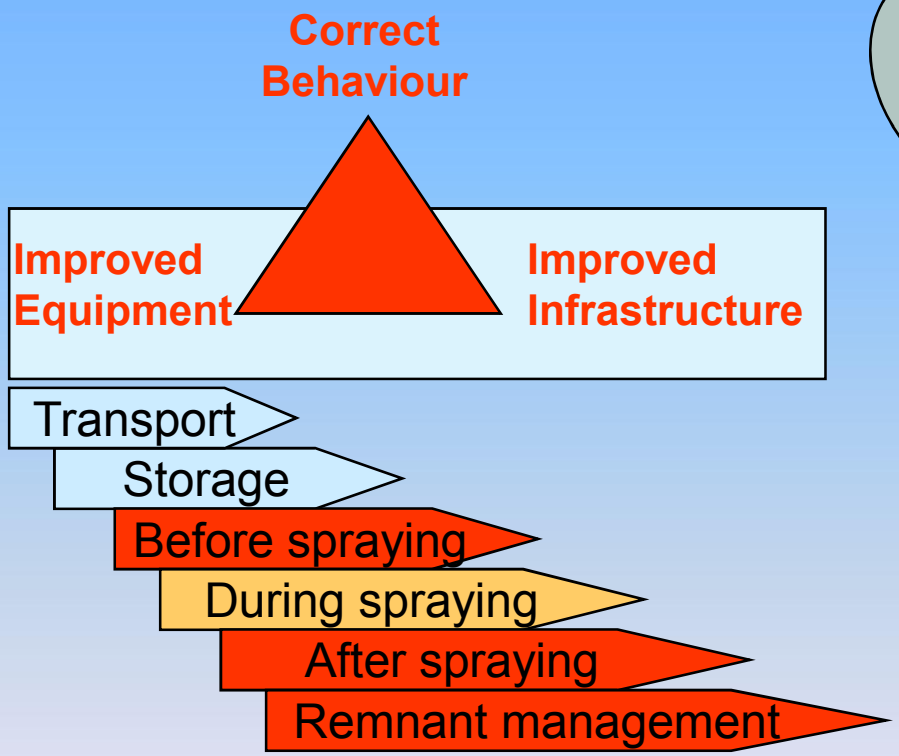
Water Framework Directive

Thematic Strategy on sustainable use of pesticides

Machinery Directive

Common Best Management Practices to avoid point sources key achievement of TOPPS

Consistent structure



Iterative development and approval process

Partners + TOPPS members

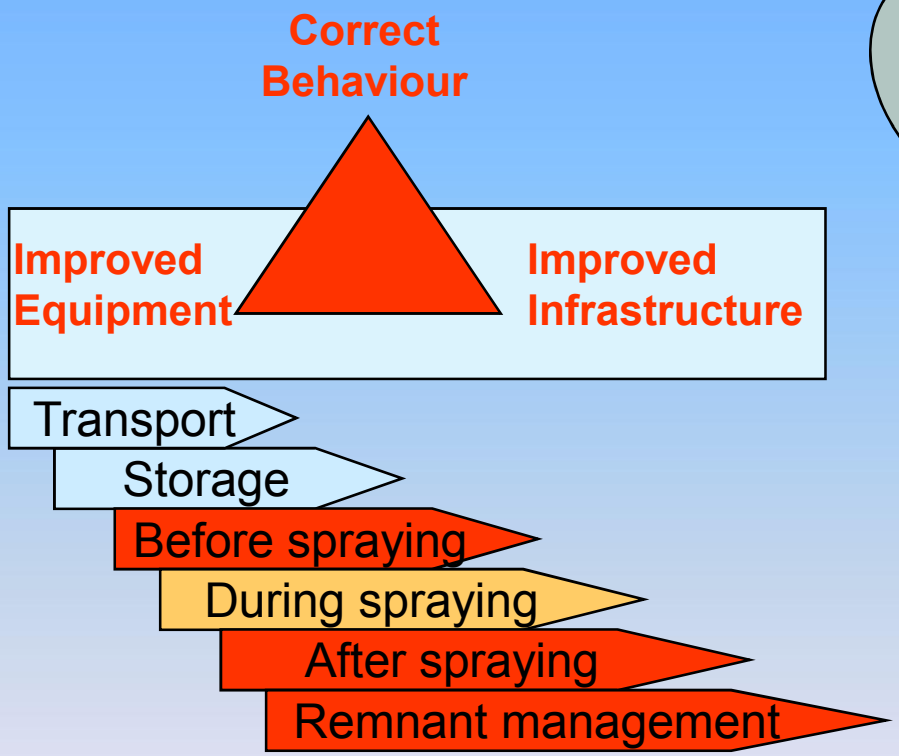
National / cluster stakeholders

EU stakeholders

Common – Consistent = Credible

Common Best Management Practices to avoid point sources key achievement of TOPPS

Consistent structure



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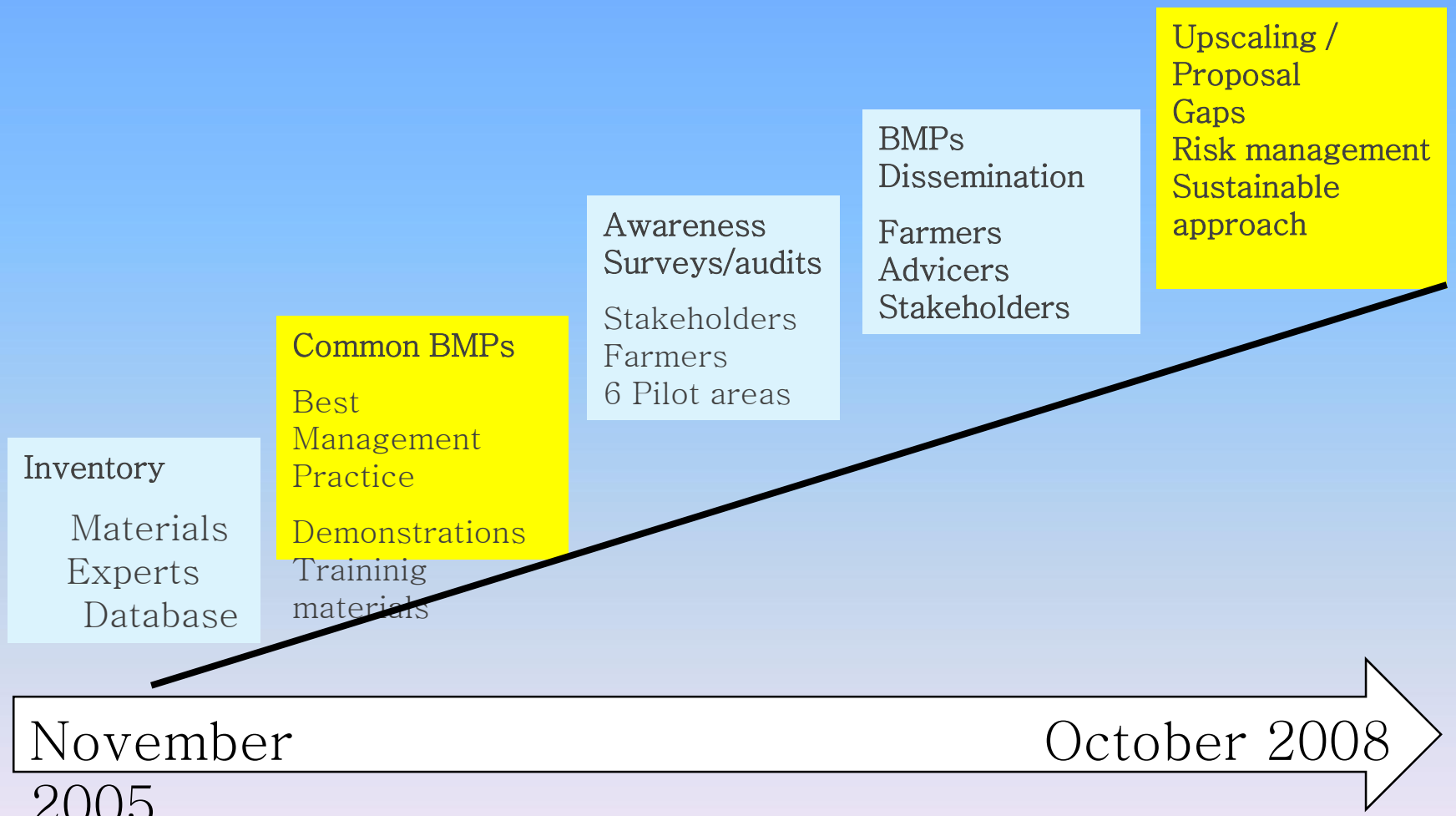
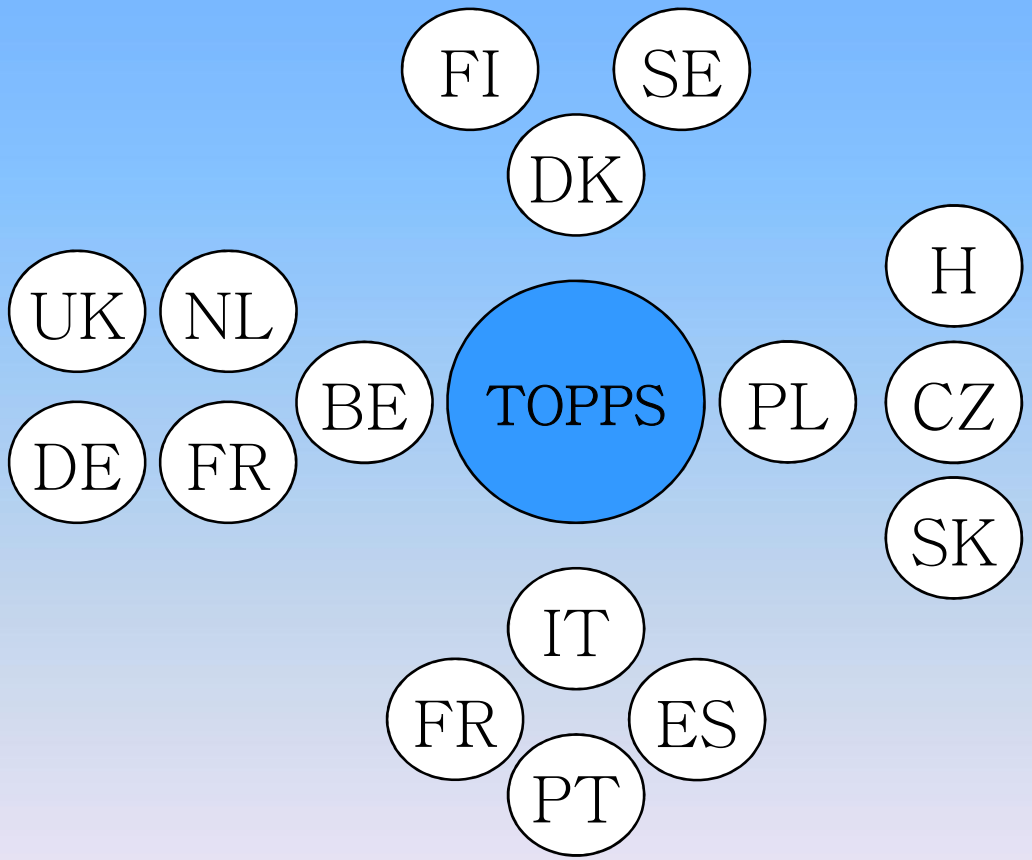
Common – Consistent = Credible

TOPPS – PROJECT – Tasks



TOPPS – PROJECT – 15 EU countries / 18 cooperators



Partners
Belgium POVLT, Pcfruit

Poland ISK, IMUZ

Denmark DAAS

Germany LWK-NRW

France Arvalis, Cemagref

UK Harper Adams Univ Col.

Spain Univ Catalunia CEIB

Italy Univ Turin DEIAFA

9 Subcontractors

NL, PT, CZ, SK, HU, SE, FI,

Two main entry routes of PPP into surface water

Point source

Point sources are related to the handling of PPP

Key risk working processes are

- Filling of sprayer
- Cleaning of sprayer
- Management of contaminated solutions after spraying (Remnant management)

Diffuse source

Diffuse sources are mainly related to the application of PPP and are influenced by soil conditions and weather and the cropping

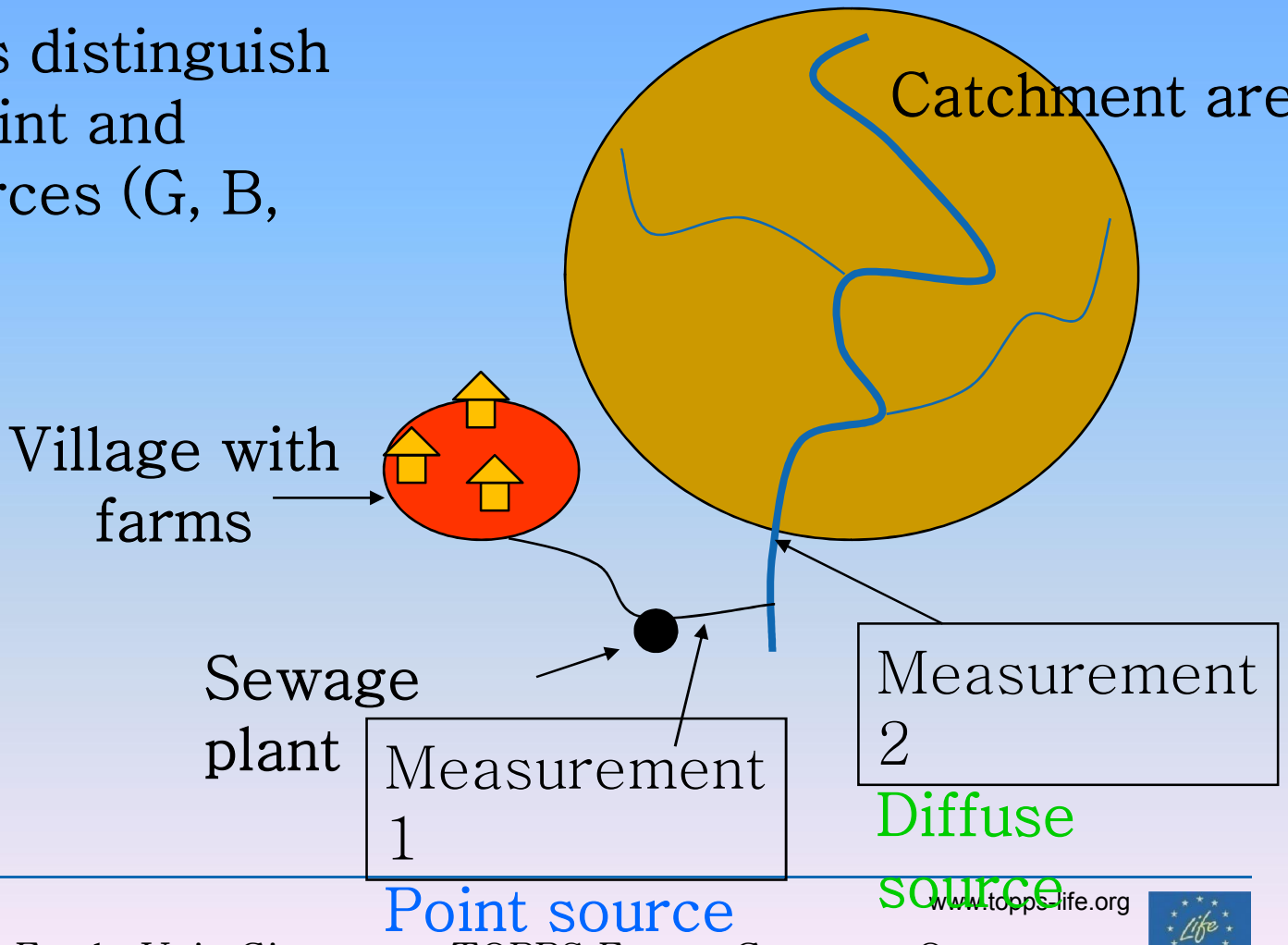
- Run-off from field
- Drift
- Drainage

PPP = Plant Protection Products

POINT SOURCES were not sufficiently in the focus

Method of point sources measurement - Univ Giessen)

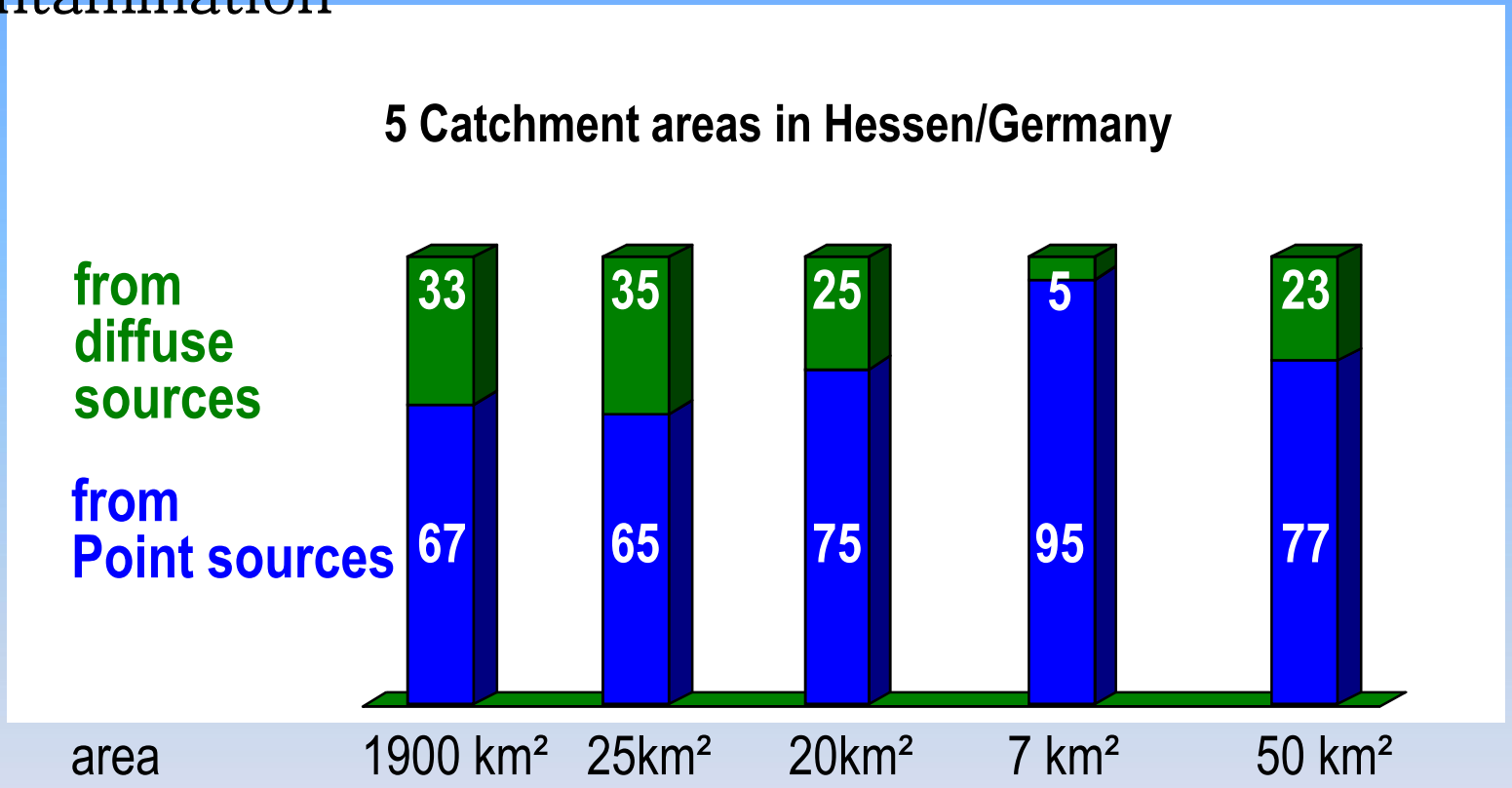
Few studies distinguish between point and diffuse sources (G, B, UK)



Presented by Prof. Frede Univ.Giessen at TOPPS Forum Germany Oct 2006 (changed)

SIGNIFICANCE OF POINT SOURCES

Point sources are the main route of suface water contamination



POINT SOURCES CONTRIBUTE > 50 %

Presented by Prof. Frede Univ. Giessen at TOPPS Forum Germany Oct 2006 (changed)

Drinking water threshold
0,1 µg/l or 0.1 ppb
(Surface water ? , aquatic organisms)

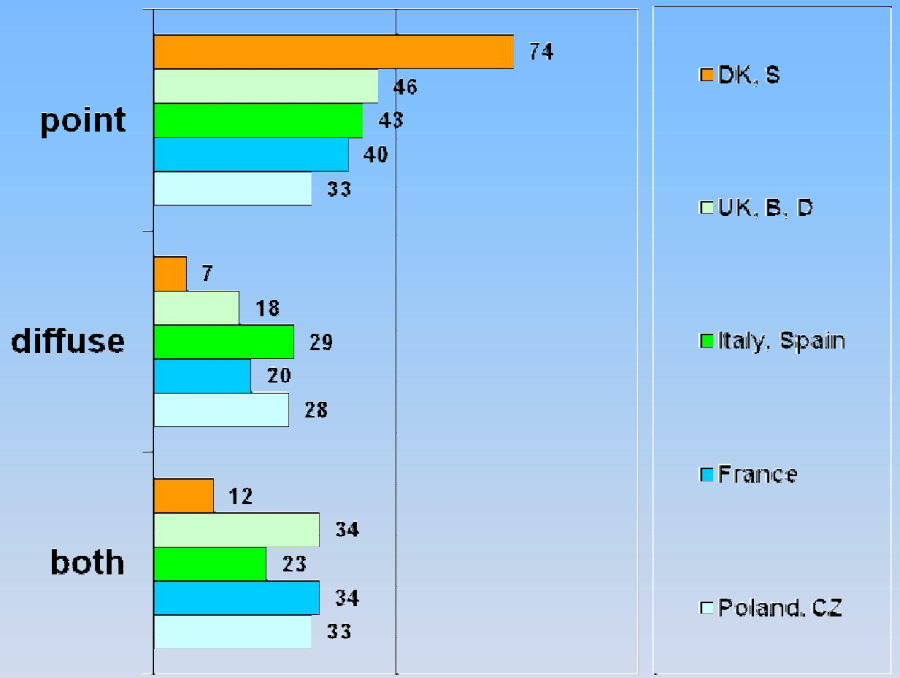
Product A.I % w/w	Milliltres of product	Gms. of active	Litres of water needed to dilute down to 0,1 ppb	Equivalent length of stream needed (1metre wide x 0.3 metres deep) in kilometres
50	1,0	0,50	5.000.000	17
50	1,5	0,75	7.500.000	25
50	2,0	1,00	10.000.000	33
50	5,0	2,50	25.000.000	83

Source: Volunteer Initiative - UK

SIGNIFICANCE OF POINT SOURCES

Stakeholder awareness survey (10 countries)

Perceived Point Source significance ?



Stakeholder survey 10 countries (n = 600)

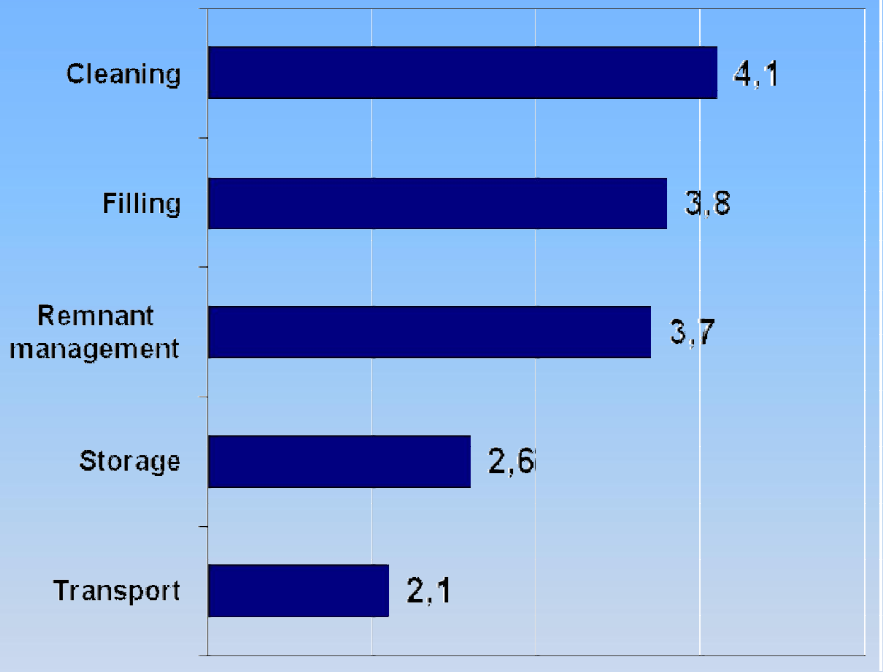
- Point sources are perceived the major contamination source
- 74% in Nordic region see point source the most important entry route of PPP into water
- Answers in both suggest that there is no clear opinion on the main entry route

But > 80% consider point sources the entry route which can be easiest avoided

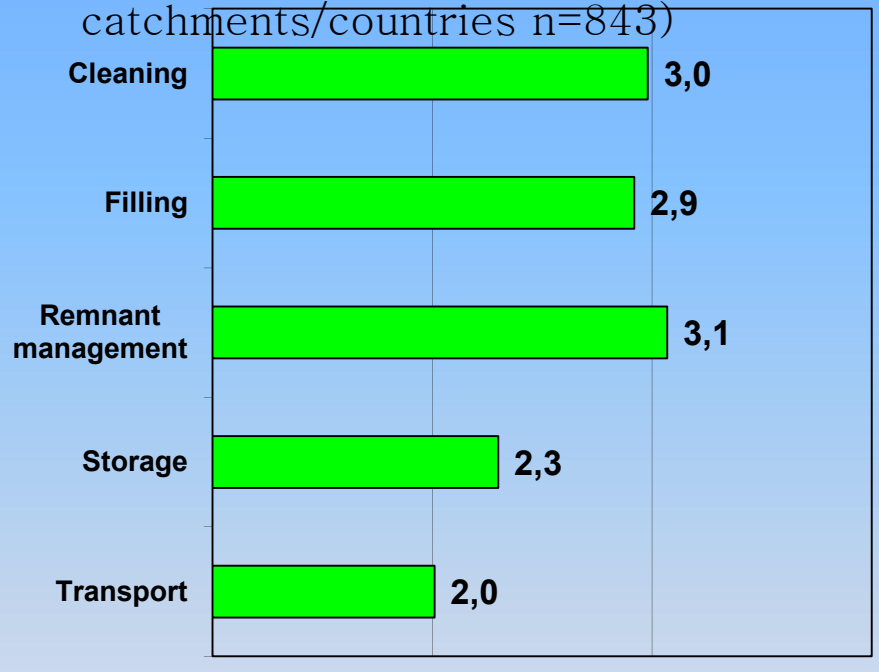
Critical work processes to avoid point sources

Perceived point sources risk by working processes

Stakeholders survey n=600



Farmers surveys(6 catchments/countries n=843)



... about 20 to 50 % of the operators differenciate the risks by work process – need for information and advice

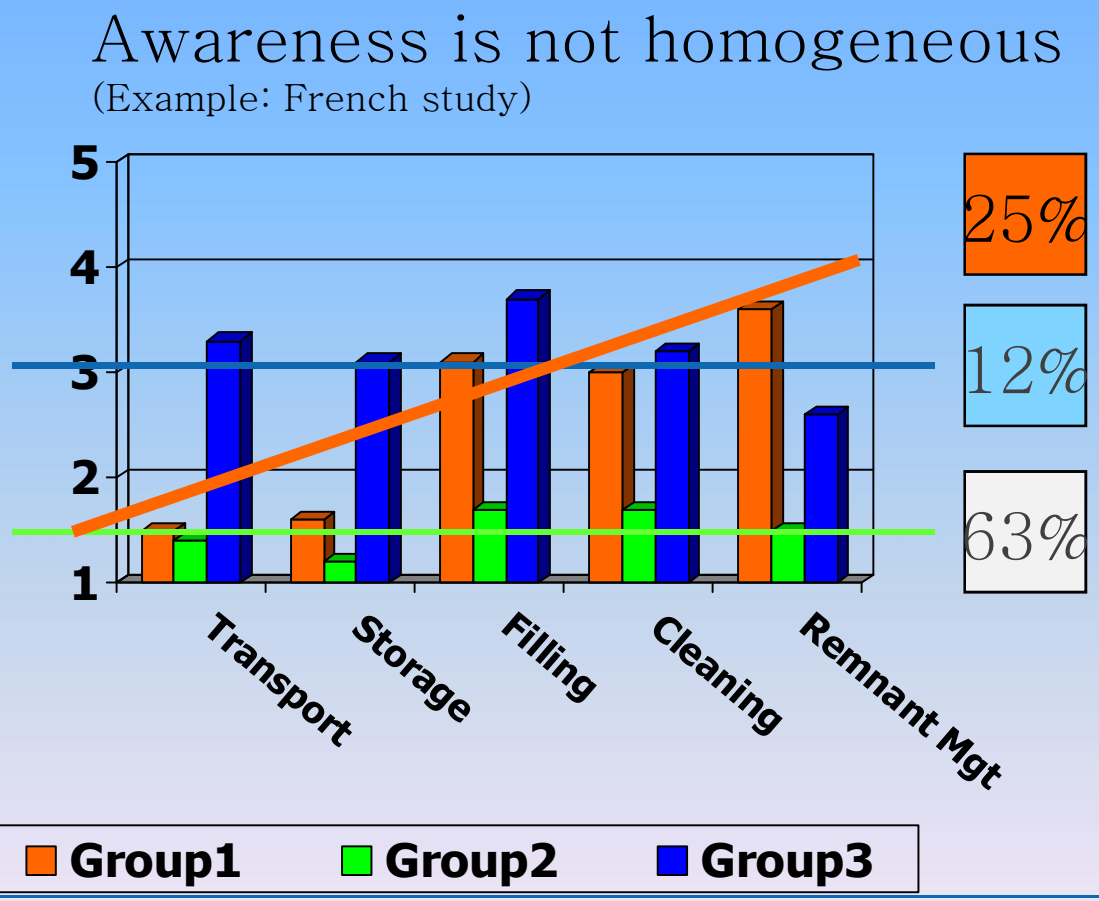
Scale: 5=high risk...1 = low risk

You only can act correctly if you know the problem

(Farmer survey example)

Between 20 and 40 % of the operators could evaluate different work processes related to their risk to contribute to water pollution.

GOOD ADVICE AND INFORMATION NECESSARY



Key risk area cleaning inside

Big risk if this is done in the farm yard

Sprayer cleaning close to surface water

Cleaning - Standards

EN-standard residual volumes

Current standards for 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

Current standards for Orchard/Vine sprayers

Total residual volume in l (EN12761-3)		
Tank volume	%	Total litres
400	4%	16
800	3%	24
1500	2%	30

Standards serve as an guideline for application techniques requirements

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

Arable Farmers clean their sprayers 7 to 10 times / season*

*TOPPS farmer surveys

Residual volumes: worst case risk if cleaning on farm without collection (assumption based on standards EN 12761 – Modelcalculation)

Fieldsprayers

Assumption: 250l/ha and 1000 gai / ha

Fieldsprayer	Spray l	g ai	10 cleanings
800 l	34	136	1360
3000 l	57	228	2280
4000 l	93	372	3720

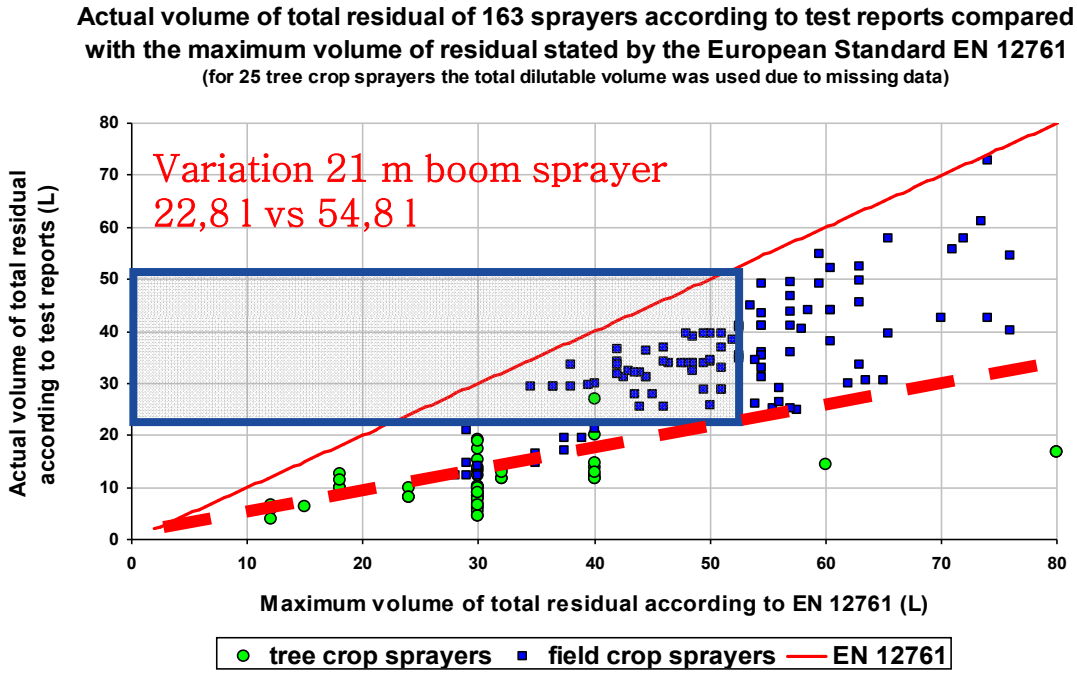
Orchard/Vine sprayers

Assumption: 250l/ha and 2000 gai / ha

Orchard sprayer	Spray l	g ai	10 cleanings
400 l	16	128	1280
800 l	24	192	1920
1500 l	30	240	2400

Reduction by 50% already possible by better designed sprayers

Variation between sprayers are big



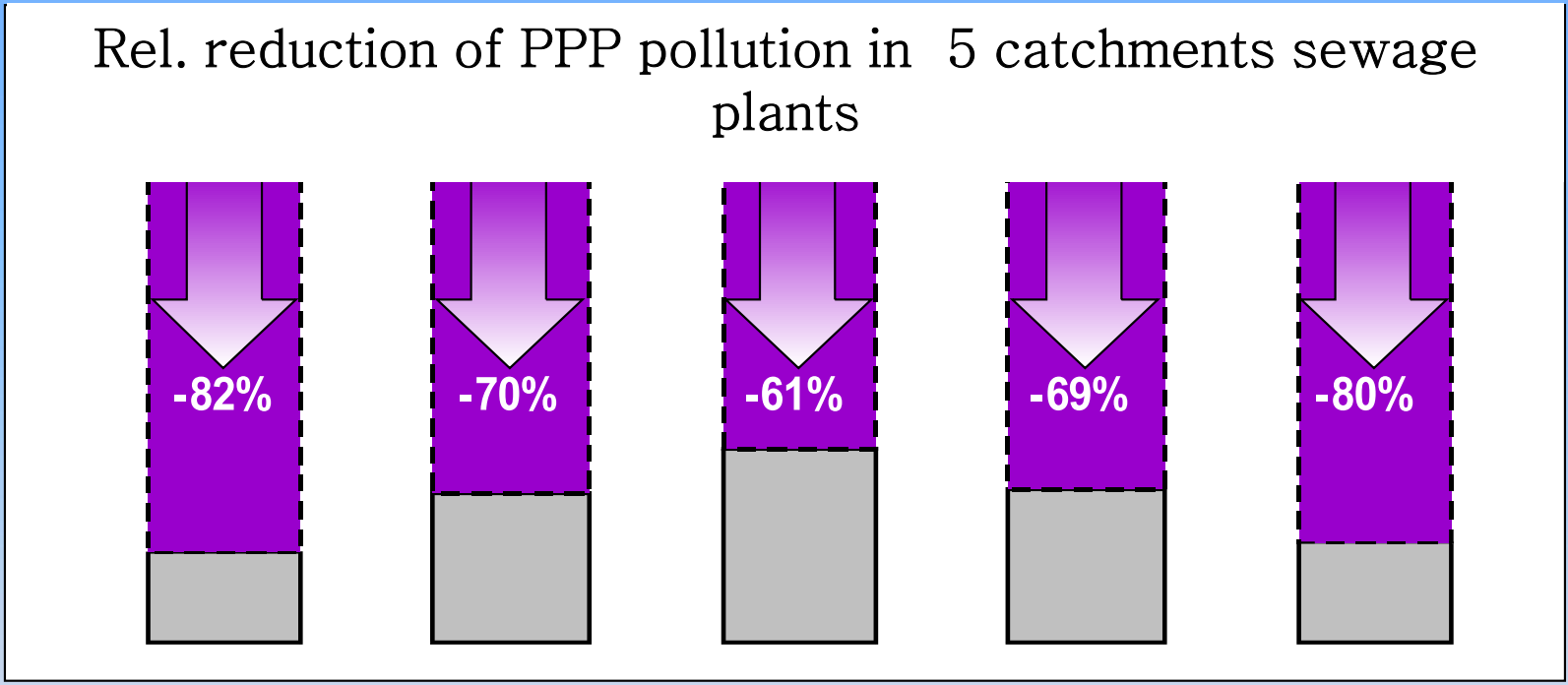
All sprayers reached the standard but

Technical solutions available are already much better than the standard

Significant mitigation potential

SIGNIFICANCE OF CLEANING ASPECT

Reduced PPP in surface water after intensive training and transfer of sprayer cleaning to the field .- Study: Univ. Giessen Hessen /Germany

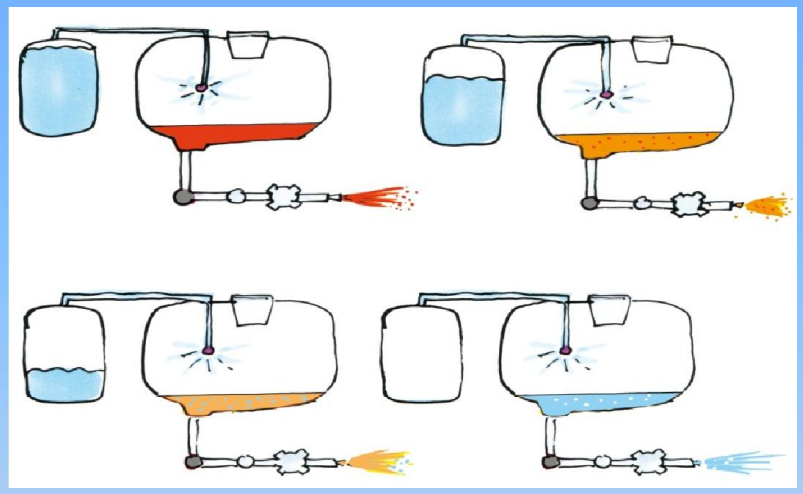


The cleaning process of the sprayer transfered to the field is able to reduce the point source pollution by about 70%

Presented by Prof. Frede Univ. Giessen at TOPPS Forum Germany Oct 2006 (changed)

Key risk area: Cleaning inside (Best Management Practice)

Triple rinsing method



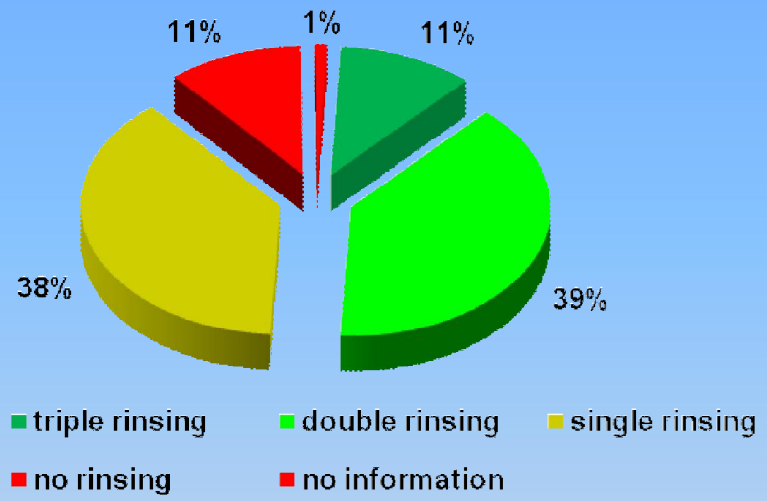
Continuous rinsing method (TOPPS-clean)
(additional pump, but more conventient, faster, less water)

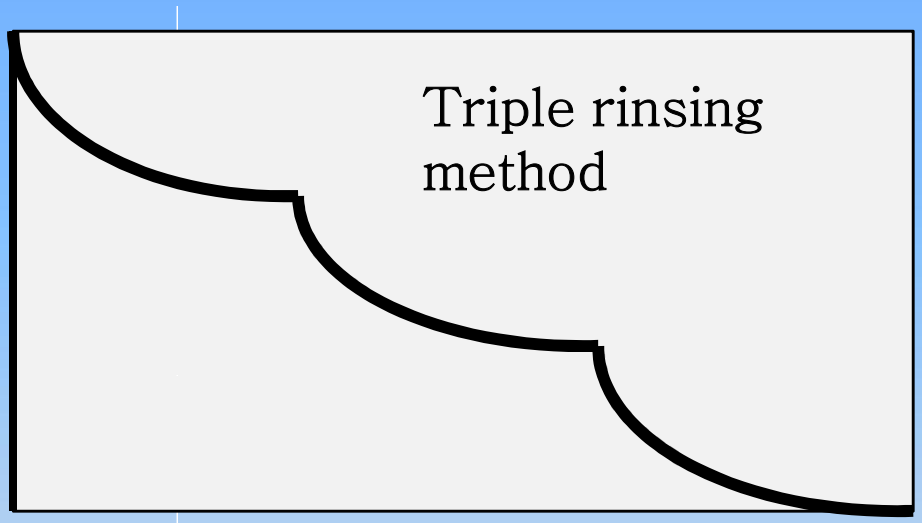
Spray diluted liquid out in the field

Bring as little contaminated liquid as possible back to the farm

Cleaning – Practice (triple rinse)

Diluted spray solution needs to be sprayed out after each rinsing step
Example of rinsing procedures in practise (farmer survey*)



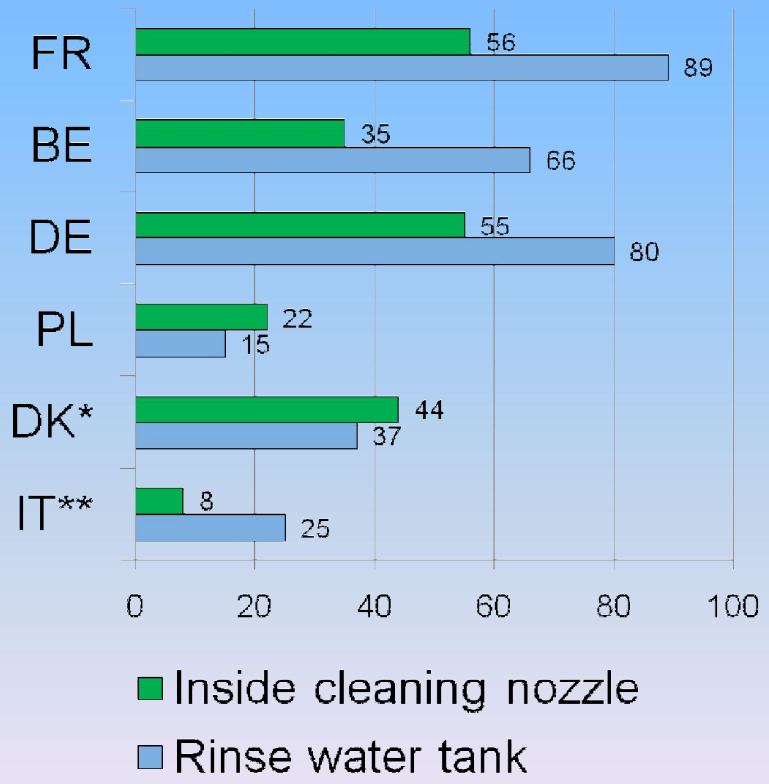


- **Triple rinsing procedure if not automized is not really convenient**
- **After each rinsing step the operator needs to step down from the tractor**
- **After each rinsing the step the operator needs to spray out the diluted spray liquid.**

* Farmer survey pilot area FR

Rinse water tank is a prerequisit to clean sprayer properly

Pilot area surveys % sprayers equipped
*DK 2/3 part time farmers
** IT vine/orchard sprayers

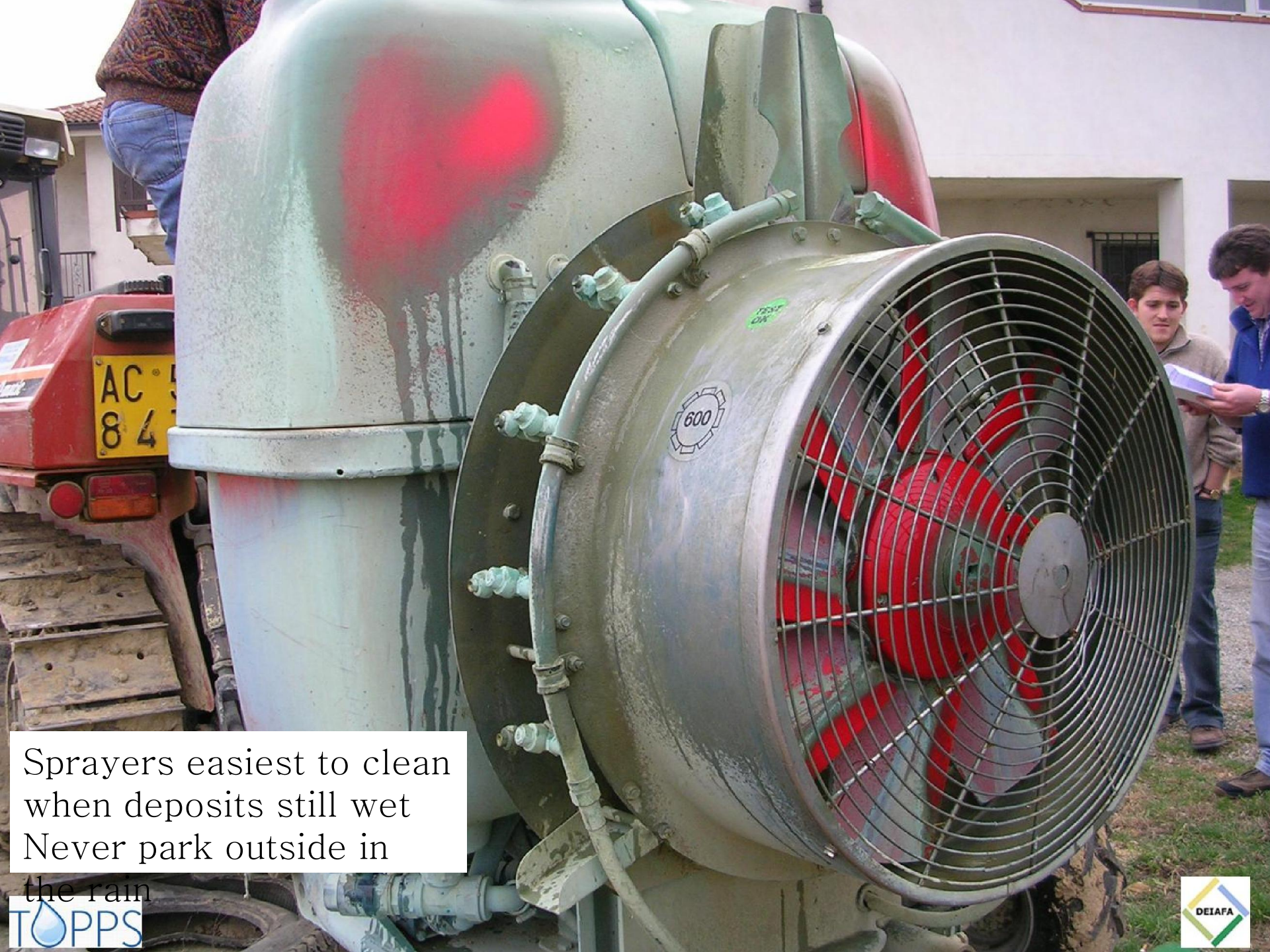


- Current recommendations often to general.

- Procedures should be explained in detail to operators

- Regulations FR + DK
FR if dilution to 1% achieved remaining liquid can be completely be left in field

- Orchard sprayers have less residual volumes (less pipes / booms) but often spray liquid is higher concentrated !!



Sprayers easiest to clean when deposits still wet
Never park outside in the rain

Outside contamination

Orchard/Vine sprayers

Outside contamination 0,33 to 0,83% of applied amount (Balsari et al 2006)

Assumption: 25 kg ai / ha and year
82,5 to 207 g ai C.Debaer et al.

(20 ha 1650 gai to 4140 gai)

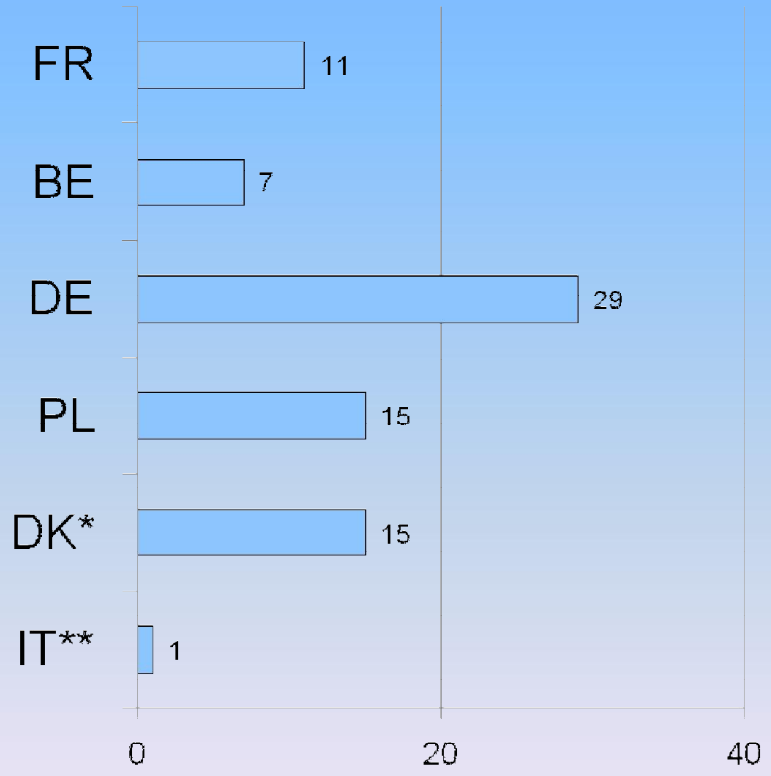
Riskmitigation: Outside cleaning device and cleaning in the field

Example: 25 l washwater 4 bar remove deposits 97,5 %
after 10 hours (dry) 25 l washwater removes 70% or
125 l of washwater remove 97,5% (Debaer 2008)

High preasure cleaners are even more effective

Outside cleaning especially important for air assisted sprayers

Pilot area surveys % sprayers equipped
*DK 2/3 part time farmers
** IT vine/orchard sprayers



Outside deposits can be significant
• little water is needed for cleaning if deposits are still wet

•Therefore spray lance should be attached to sprayer for outside cleaning in field

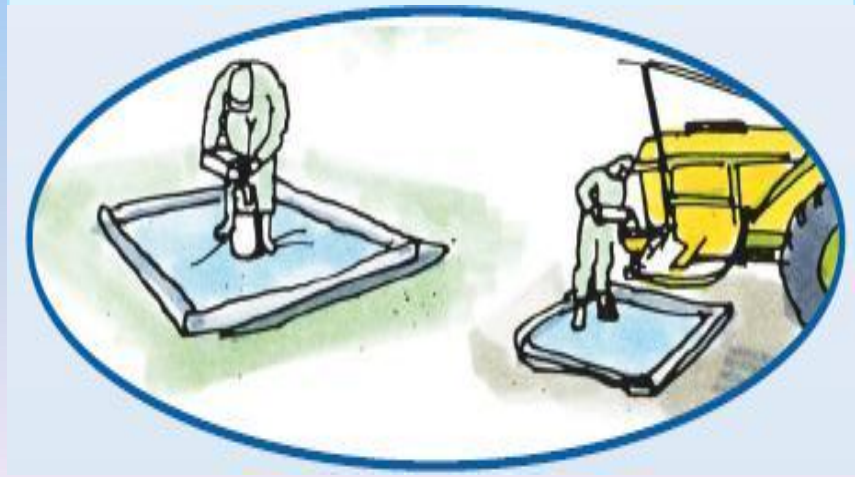
Key risk area filling

Bad empty container management

Key risk area – filling (Best management Practice)

On farm most common practice

- Fill on dedicated place
- Fill only if precautionary measures taken to collect any spills
- Avoid any drainage to surface water



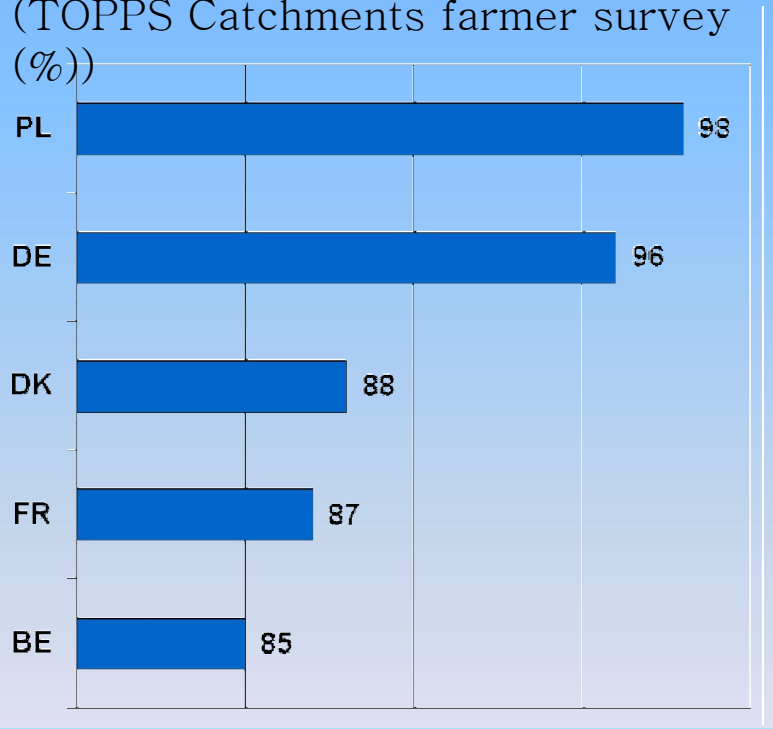
In the field low investment

- Vary site of filling place
- Keep adequate distances to water bodies

Filling process (Filling/Dosing of PPP concentrate)

Precausionary measures necessary if filling on farm
Saucer Principle !!!

> than 85% of Farmers fill their sprayers on farm
(TOPPS Catchments farmer survey (%))



COLLECTION OF SPILLS AND OVERFLOWS IS NEEDED

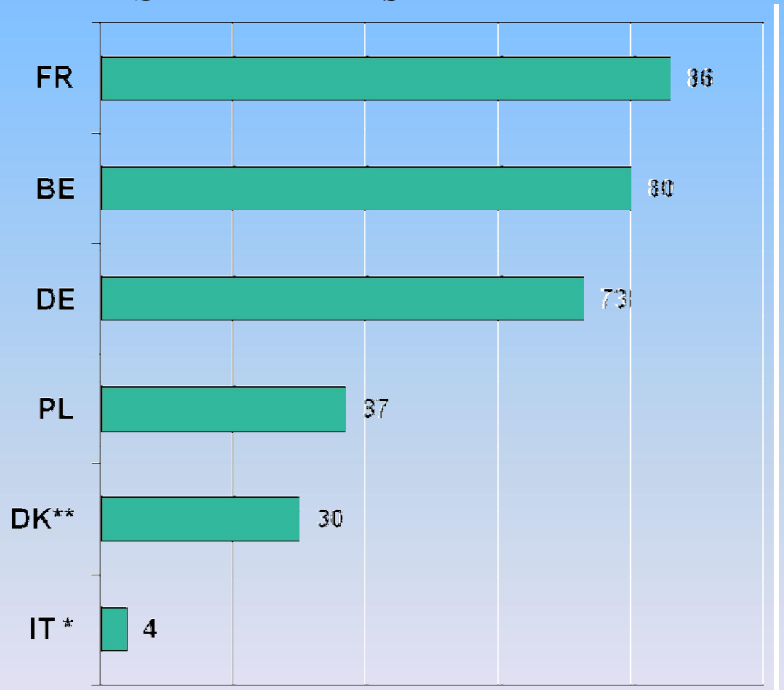
Filling process (Filling/Dosing of PPP concentrate)

Induction bowles can mitigate the risk of spills and can support good rinsing of empty packages

For orchards and vine sprayers stand alone induction bowles are available

Sprayers equipped with Induction bowles

TOPPS farm audits



*IT = orchard/vine sprayers, **DK= rel. old sprayers

Key risk area – Remnant Management

In most countries no clear regulations / recommendations

No regulation

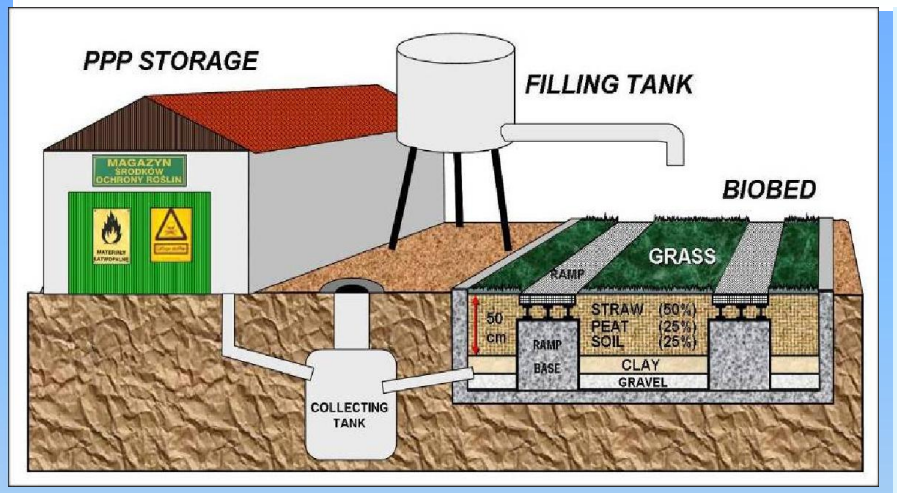
Operator needs to find a solution for himself

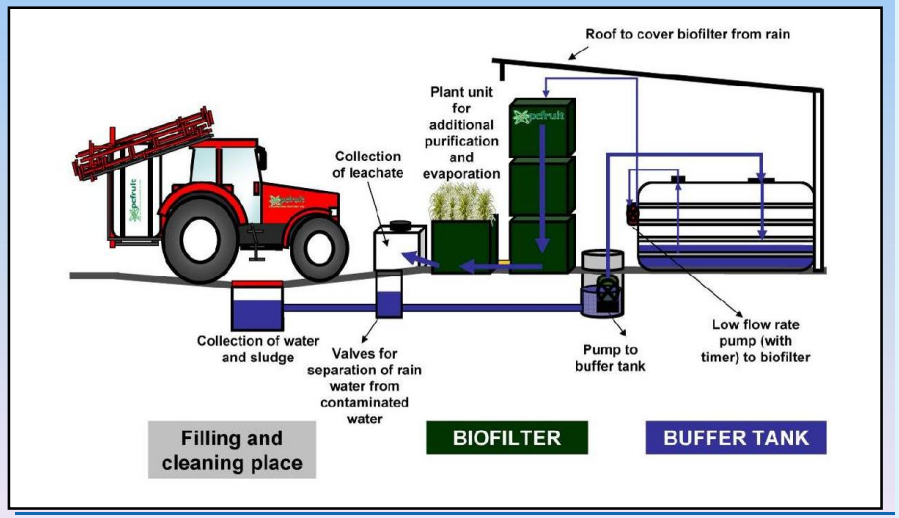
No recommendation

unsecurity

...standing in the rain is uncomfortable

Key risk area – remnant management (Infrastructure)





Collection and treatment of diluted PPP contaminated water

Biobed : Collection and bioactive matrix degrades PPP contaminated liquids

Biobeds for bigger farms
> 5 m³ of liquid to be treated

Biofilter : applies same principles as biobed (recommended for smaller farms, speciality producers)

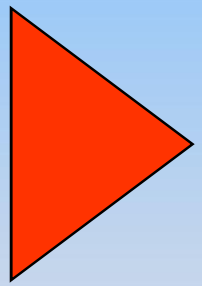
Biopurification systems are approved in FR, UK, SE and partly in BE.

Research and approval processes in other countries not yet finalised.

Further Information: Biopurification Brochure (www.TOPPS-life.org)

Technical risk mitigation opportunities need to be realised

Improved Equipment



Improved Infrastructure

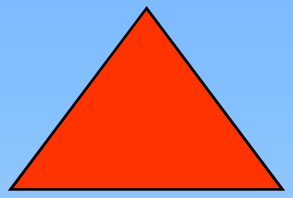
Some key technical devices should be made mandatory

- **Rinse water tank (sufficient capacity)**
- **Internal and external cleaning device (High preasure)**
- **Better measurement of water volume**
- **Filling and container cleaning devices (Induction bowls)**
- **Sprayer design should be optimized for lowest residual volume**
- **Filling and cleaning on farm require precautionary measures (place with collection facilities, bioremediation)**
- **Clear recommendations on remnants management**

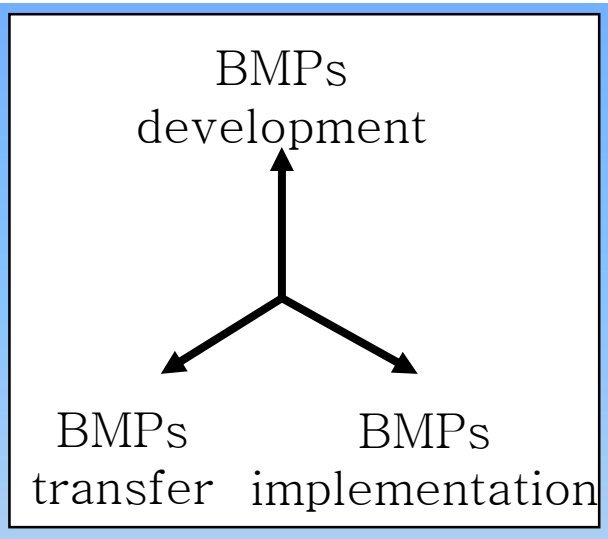
… Key is to change behaviour

Sustainable strategy to avoid point sources starts with the BMPs

Correct Behaviour



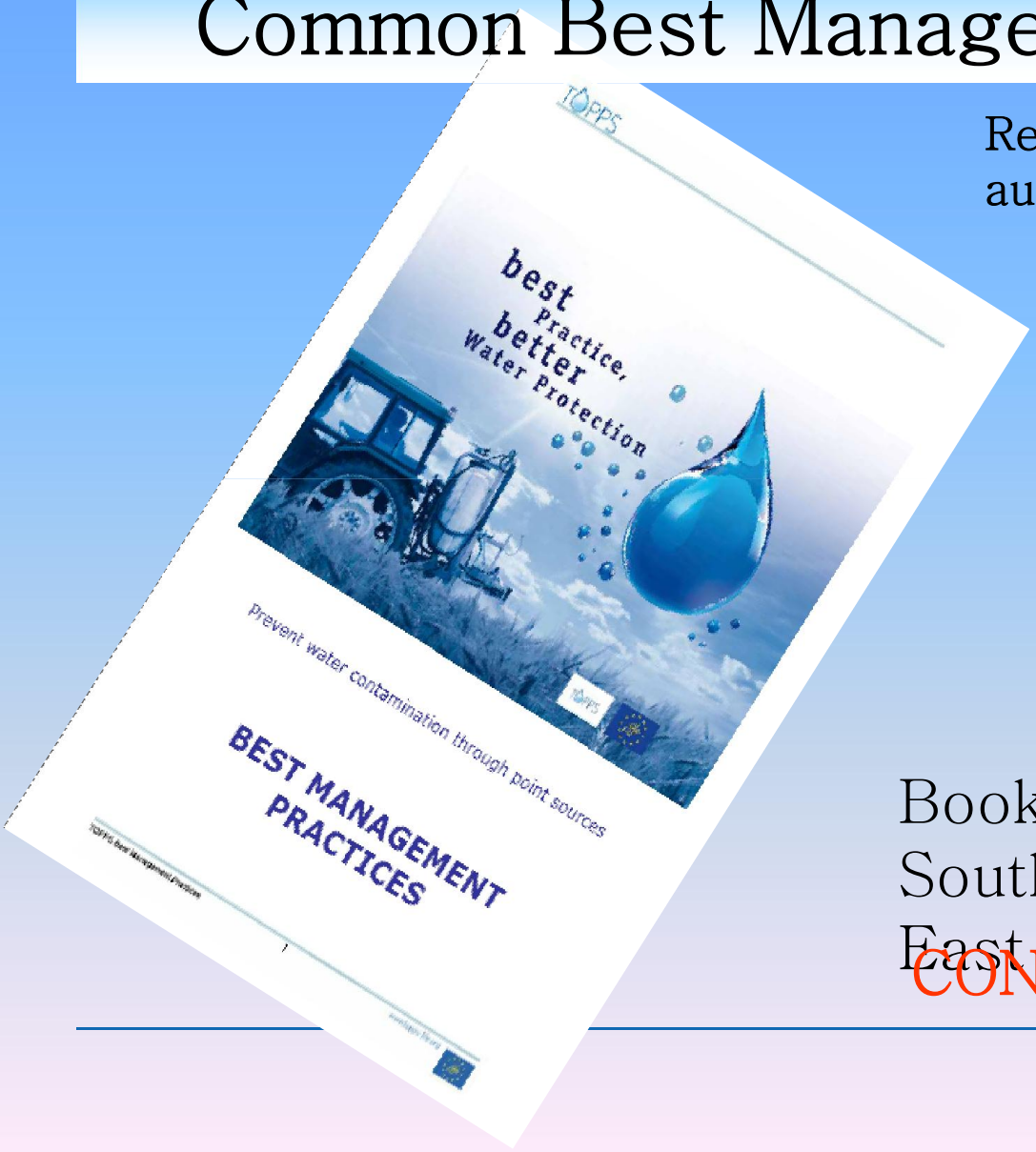
Knowledge transfer
Behaviour change !



TOPPS – KEY MESSAGES

- Develop training modules for Advisers and utilize all advice capacities
  (Certified, documented, private + public advisors: Example BASIS?)
- Create a market for agro – environmental advice
- Offer operator training modules on water protection (voluntary/mandatory)
  (Certified, documented, apply audit tools. Example: Aquasite Arvalis?)
- Define water protection targets, control processes and measure progress

Common Best Management Practises



Reference for advisers and authorities in 12 local languages

- Polish
- Czech
- Hungarian
- Slovak
- German
- French
- Danish
- Italian
- Spanish
- Portugiese
- English
- Dutch

Booklets on BMPs
Southern Countries and
East countries

CONSISTENT MESSAGE

Training Materials for Advisors/Farmers

- **Trainer handbook (pp 79)**
- **Delegate Handbook (pp20)**
- **Powerpoint presentations in 15 languages**
- **Demonstation ideas brochure**
- **Cleaning broschure**
- **Bioremediation brochure**
- **Picture Gallery for advisors**
- **Training video orchard sprayers**
- **Training video fieldsprayers**






ALL MATERIALS FOR DOWNLOAD
WWW:TOPPS-life.org

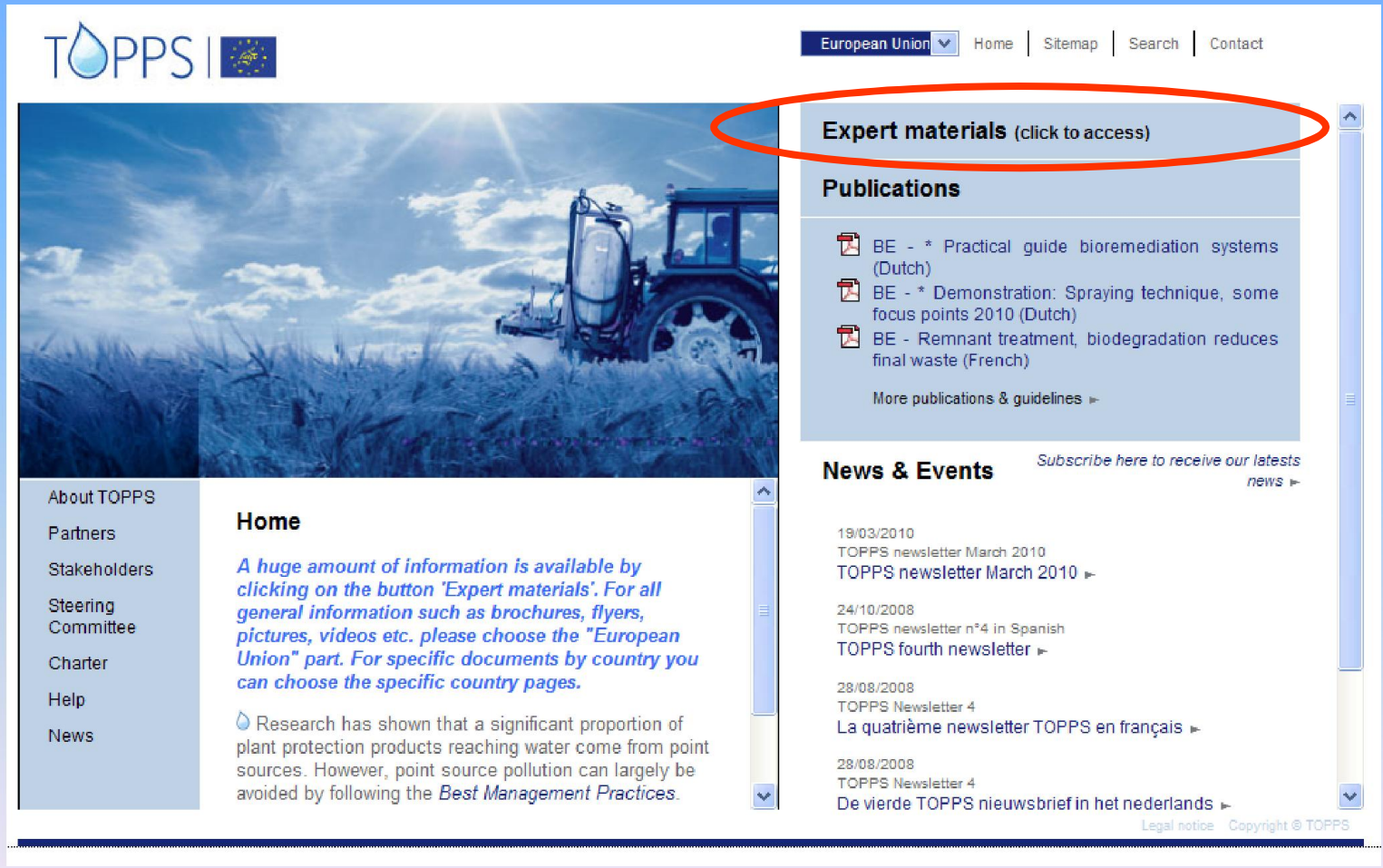
TOPPS delivers – information and knowledge platform

Dissemination of BMPS

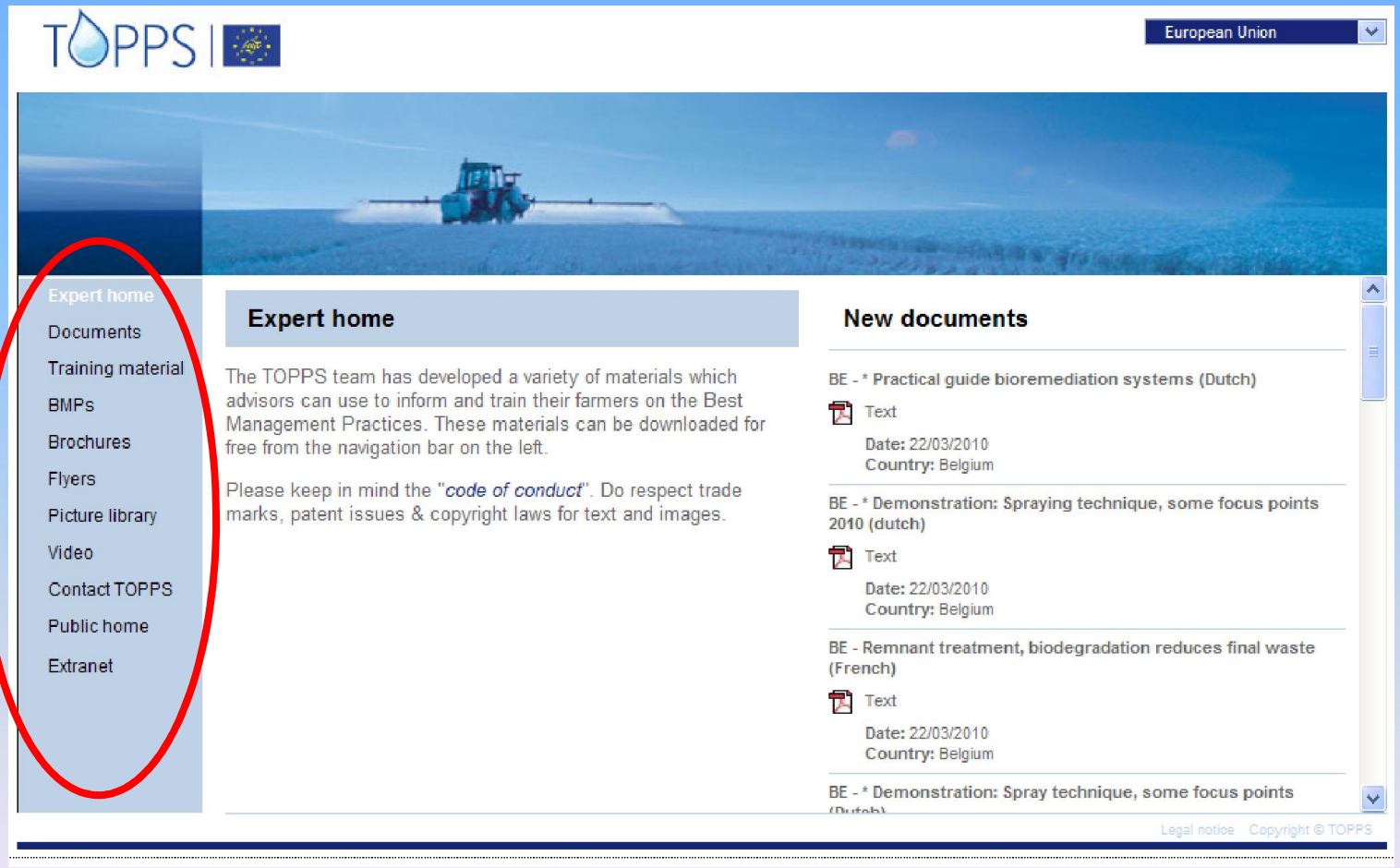
- 300 T TOPPS flyers distributed (16 languages)
- 5000 TOPPS BMPs booklets distributed
- 1500 advisors trained
- 3000 farmers trained
- > than 300 articles in farm press and websites
- 53 farmer events/ fairs participation with TOPPS stand

About 12000 visits/months on www. TOPPS-life.org

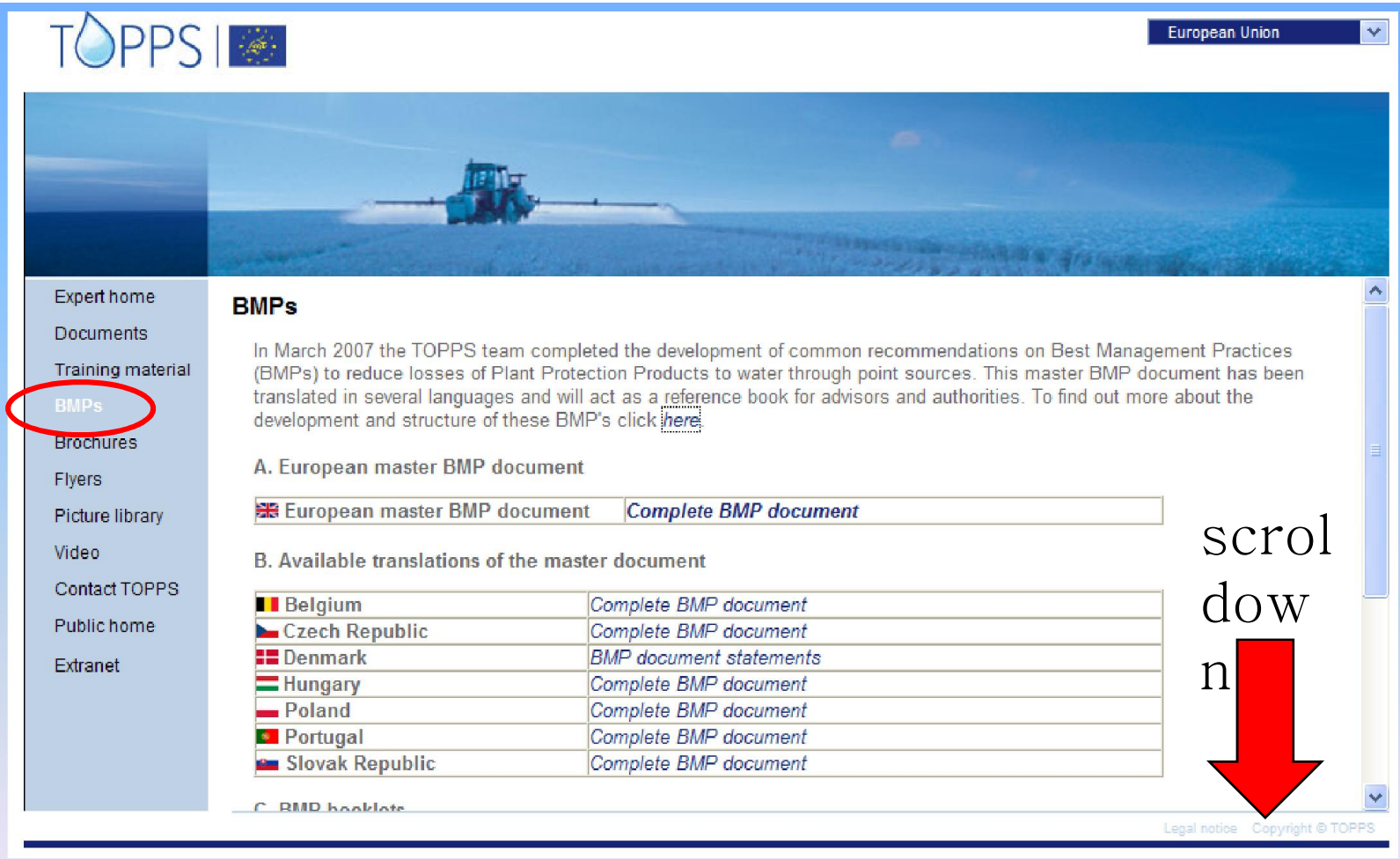
TOPPS website



TOPPS Expert materials

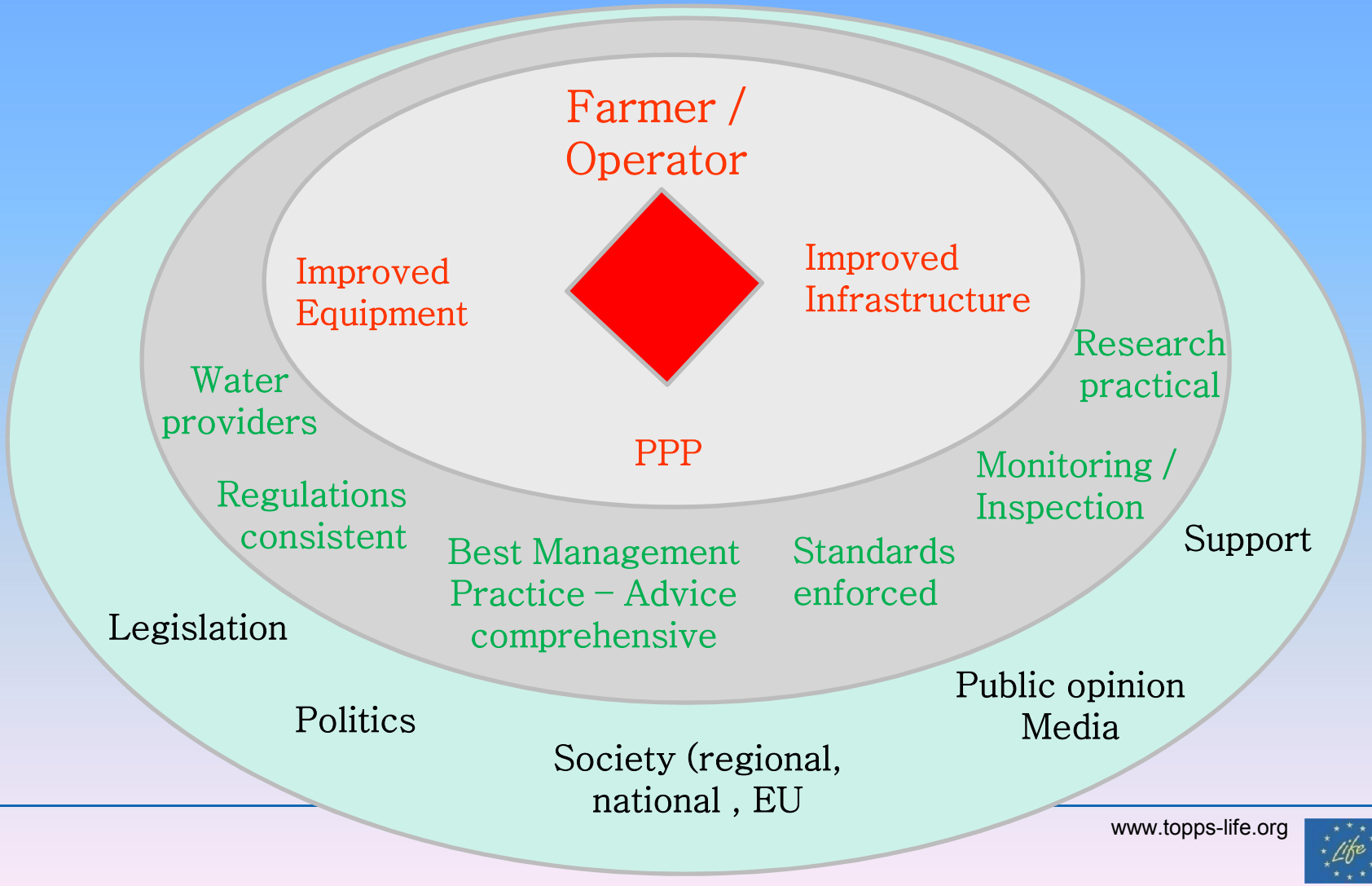


TOPPS – BMPs (Best Management Practices



Lessons learned from TOPPS

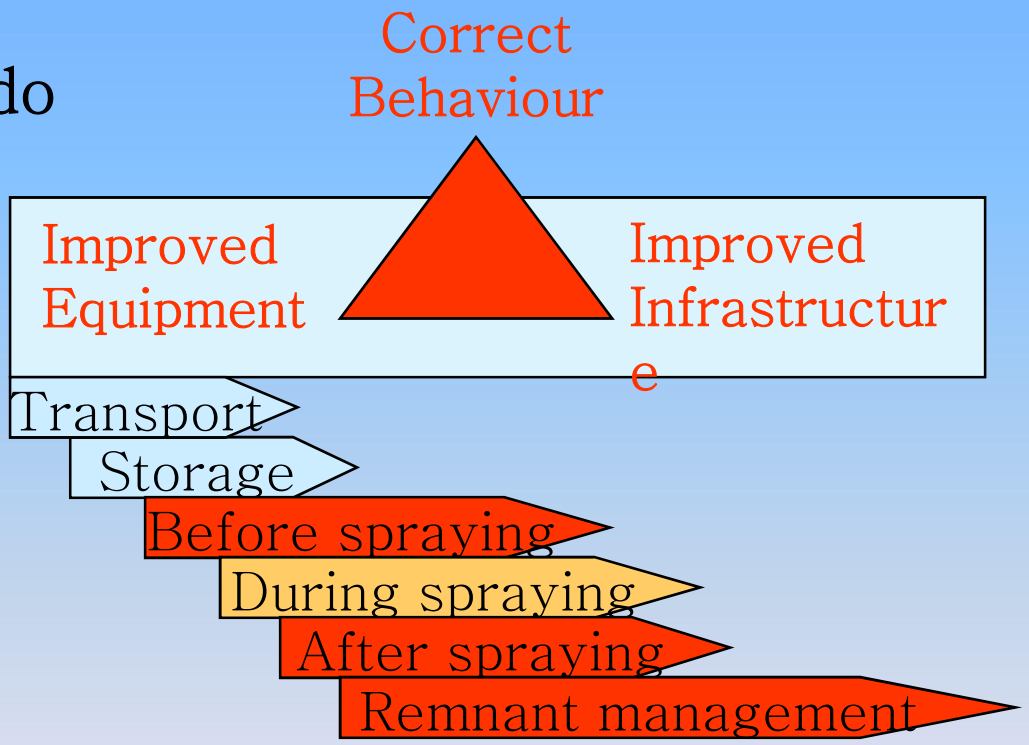
1. Mitigation of PPP water contamination is a multistakeholder task



Lessons learned from TOPPS

2. Best Management Practices need to be defined in a consistent way

- what to do and how to do things (practical)
- defined along the work processes (complete)
- European core , local adaption (credible)



Lessons learned from TOPPS

3. Efficient knowledge transfer of BMPs to advisers

- **Offer advisers training**
- **Develop business model for environmental advice**
- **Realize potential of available adviser capacity in area**
- **Measure efficiency and quality of advice**

4 . Efficient implementation of BMPs

- **Offer farmers / operators training (modules ?)**
- **Target advice given specific to an area**
- **Document content of advice given**
- **Set and communicate measurable targets for a catchment area**
- **Define and communicate monitoring process**
- **Make BMPs easy accessible**

Lessons learned from TOPPS

5 . Realize technical improvements in equipment and infrastructure

- **Develop systems / tools which allow equipment manfacturers to compete with environmentally optimized sprayers**

Outlook

ECPA – Water protection projects landscape

TOPPS I Life

15 EU countries

Bridge

AIM

Mitigation of Point sources

Mitigation Diffuse sources

PROWADIS -Life ?

22 EU countries

Oct 2005 — Nov 2008 — Sept 2010 — Oct 2013

Efficient multistakeholder risk mitigation is the target

IMPLEMENTATION REMAINS THE CHALLENGE !

Thanks for your attention

Acknowledgement for support to Life, ECPA, the TOPPS partners and many supportive stakeholders

Right focus, strategy and support will help to develop a consistent approach to protect water

STAY ON TOPPS – www.TOPPS-life.org