BEST PRACTICES TO AVOID POINT SOURCES

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TOPPS farm visit
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- Overview on practices, critical activities, and BMP toolbox
- BMP examples:
  - Tank cleaning
  - Mixing & loading
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Relevance of Point Sources

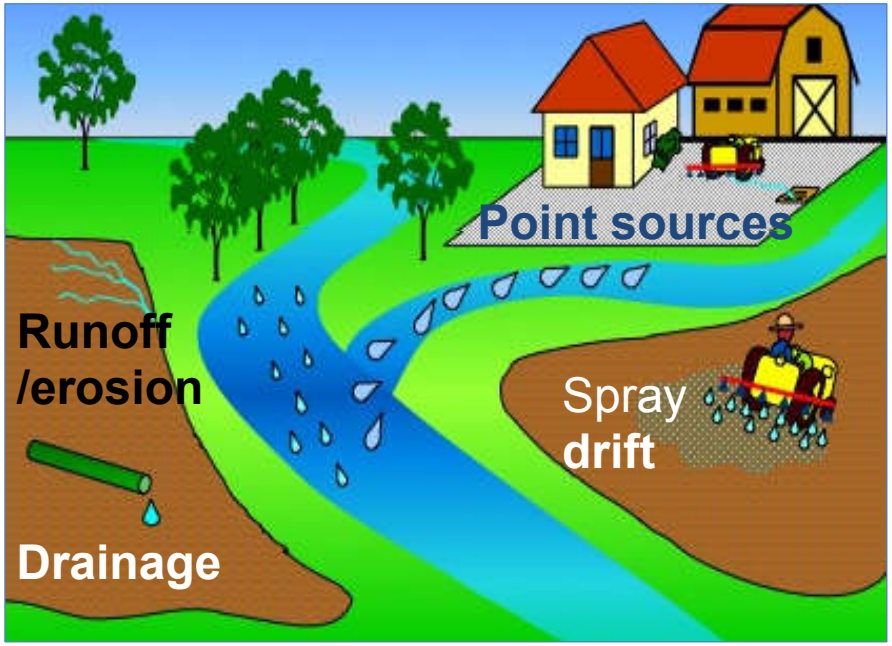
Diffuse sources from the field:

These can be reduced

Point sources from the farmyard:

can largely avoid point sources

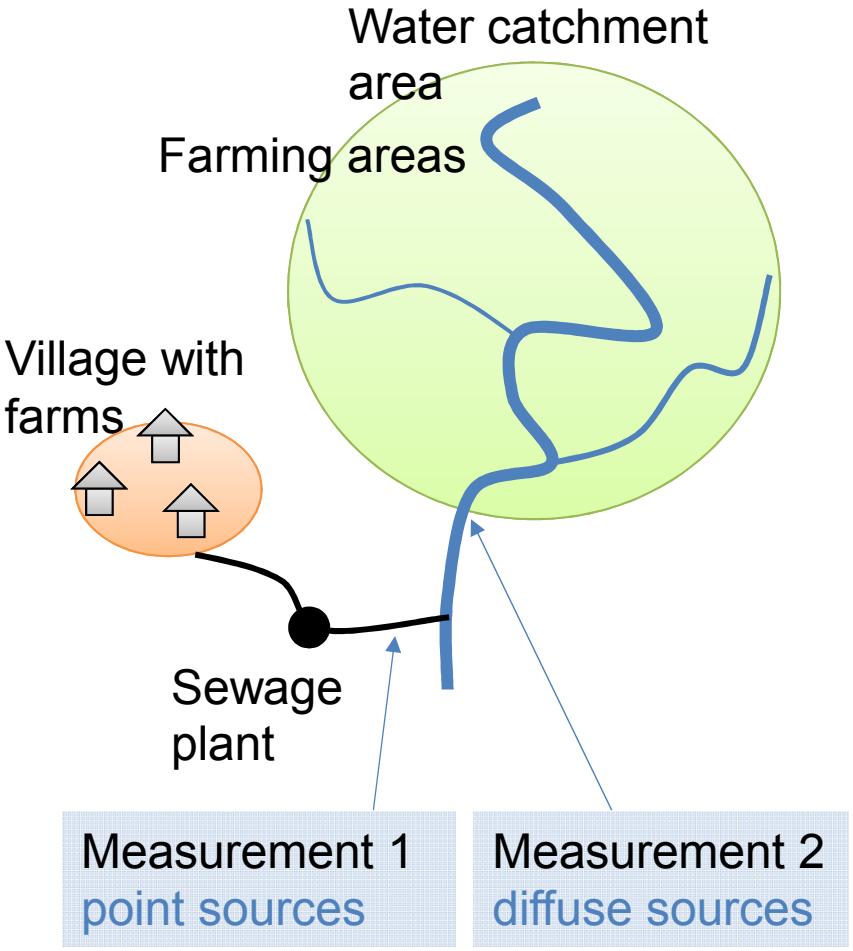
5 % Spraydrift 35 % Runoff / Erosion
> 50 % Point sources



variability in specific situations can be high

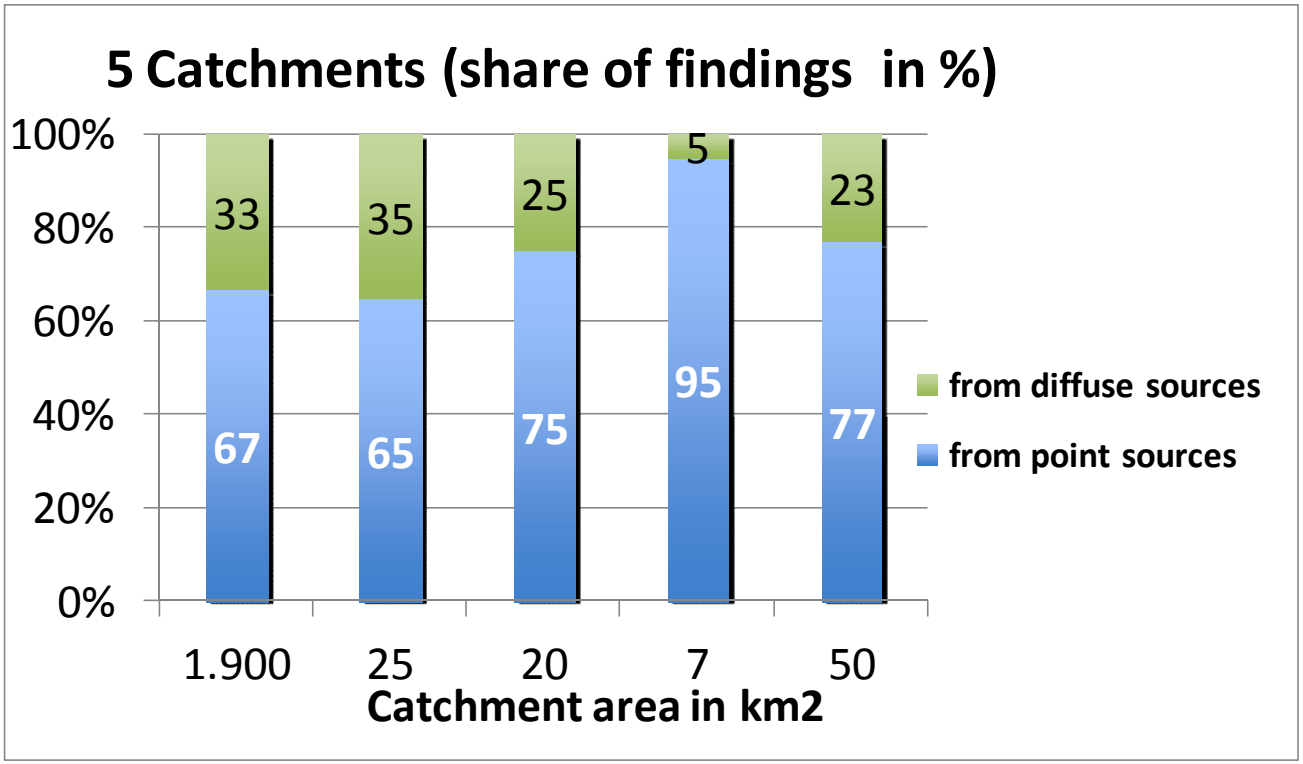
How to Assess the Relevance of Point Sources?

- Waste water of village farms collected in community sewage plant.
- Measurement point 1 measures PPP pollution from farmyards (point sources).
- Measurement point 2 measures PPP pollution from the field (diffuse sources).



* Frede *et al.* 2006, Univ Gießen

Example for Relevance of Point Sources

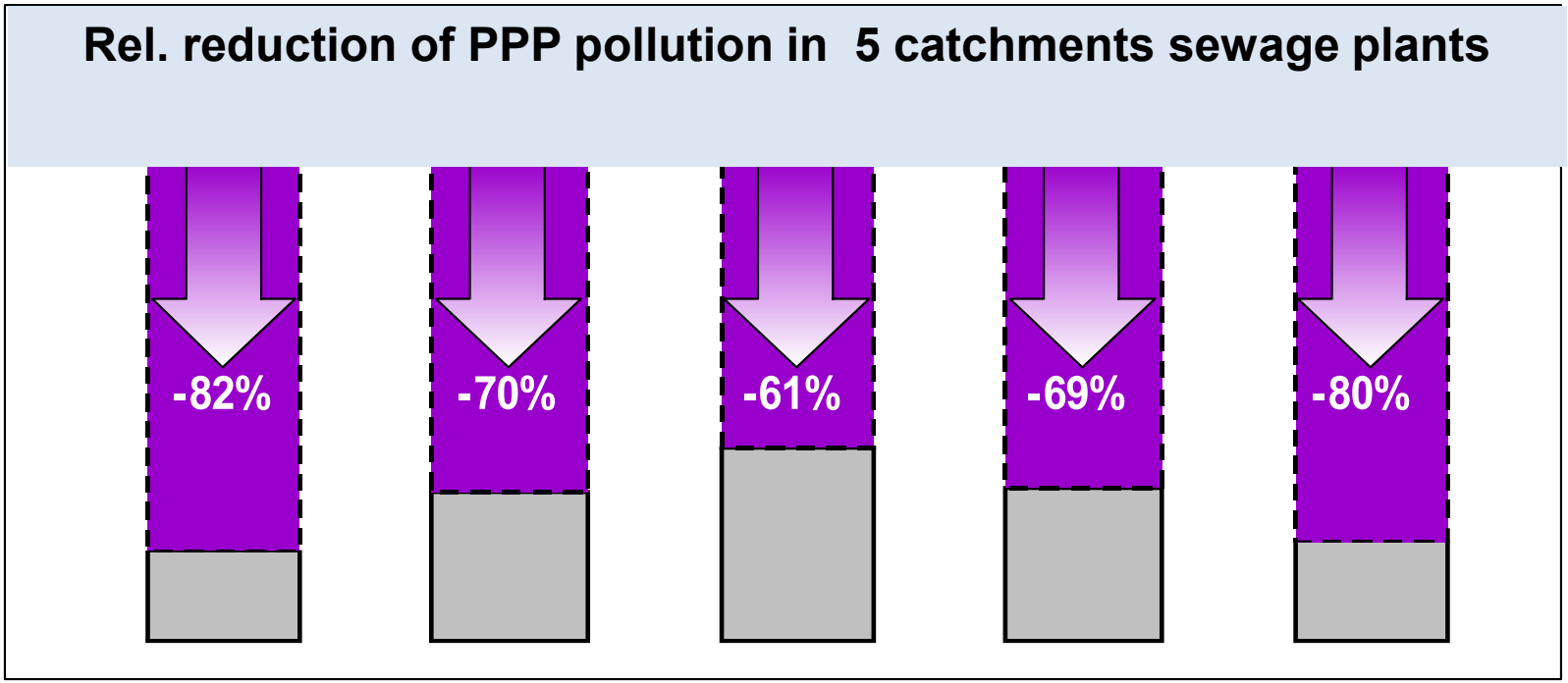


Point sources contribute > 50 % to PPP surface water entries.

Source: Prof. Frede et.al. 2006 , Univ Gießen

Reduction Potential for Point Sources

Reduced PPP in surface water after intensive training and transfer of sprayer cleaning to the field .

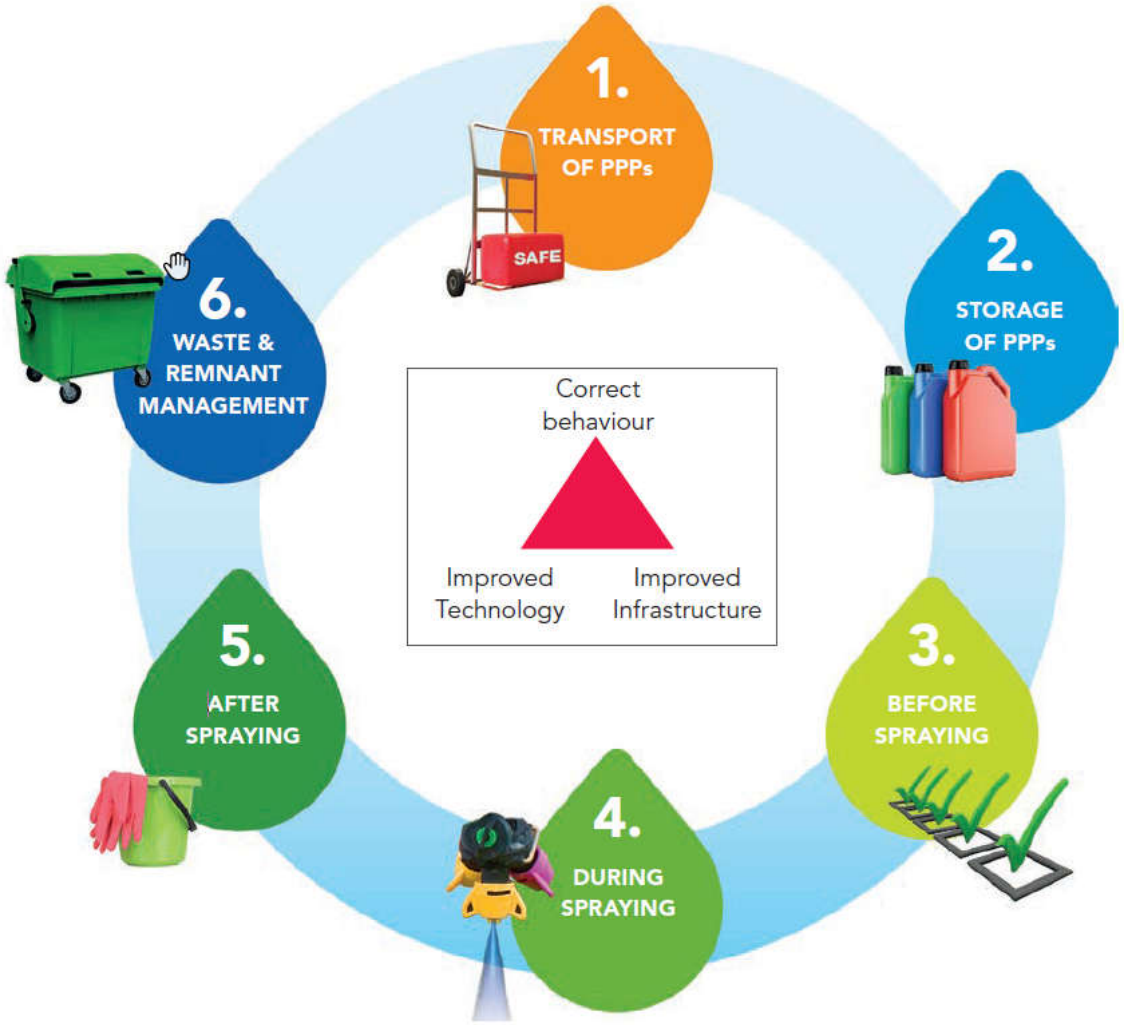


Transferring cleaning processes away from the farmyard and out to the field can reduce point source pollution by about 70% !

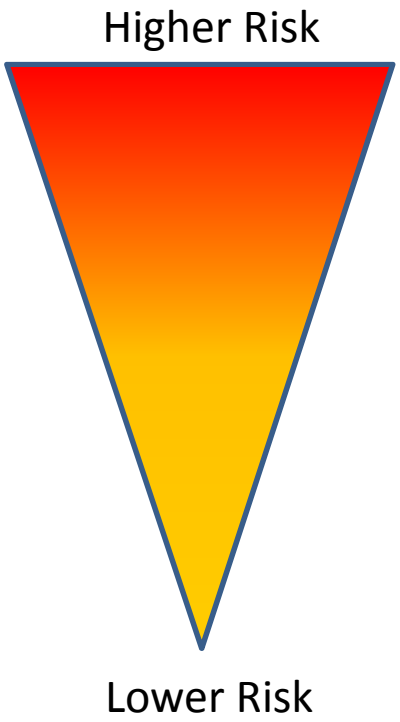
Presented by Prof. Frede Univ. Giessen at TOPPS Forum Germany Oct 2006 (changed)

BMPs toolbox : strategic triangle –

Process view includes technique + infrastructure

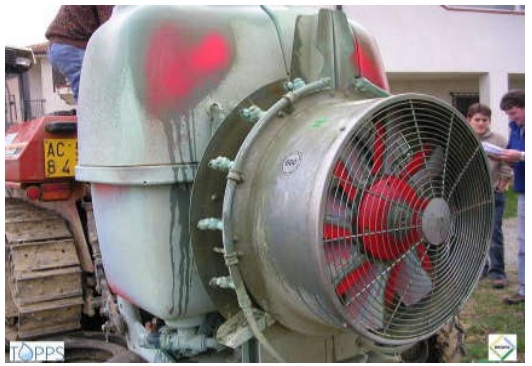


Overview: Priorities for Point Source Prevention



Critical Activities

- **Sprayer cleaning**
- **Mixing and loading**
- **Remnant management**
- **Empty container disposal**
- Transport to the field
- Farm pesticide storage
- Transport to the farm

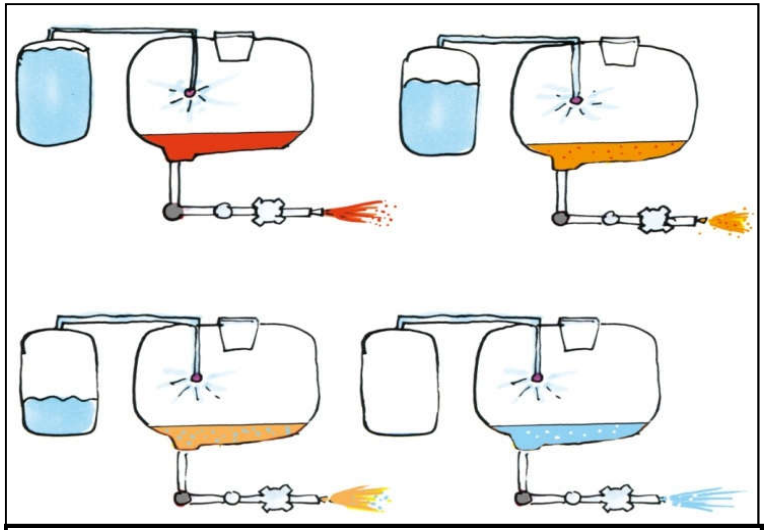


Example: Inside Tank Cleaning

Clean sprayer in the field as much as possible

BMPs

- **Inside the sprayer**
  - **Technical challenge to empty completely**
  - **Technical improvements:**
    - Reduce the residual volume
    - Make cleaning more user friendly
      (Continuous cleaning)

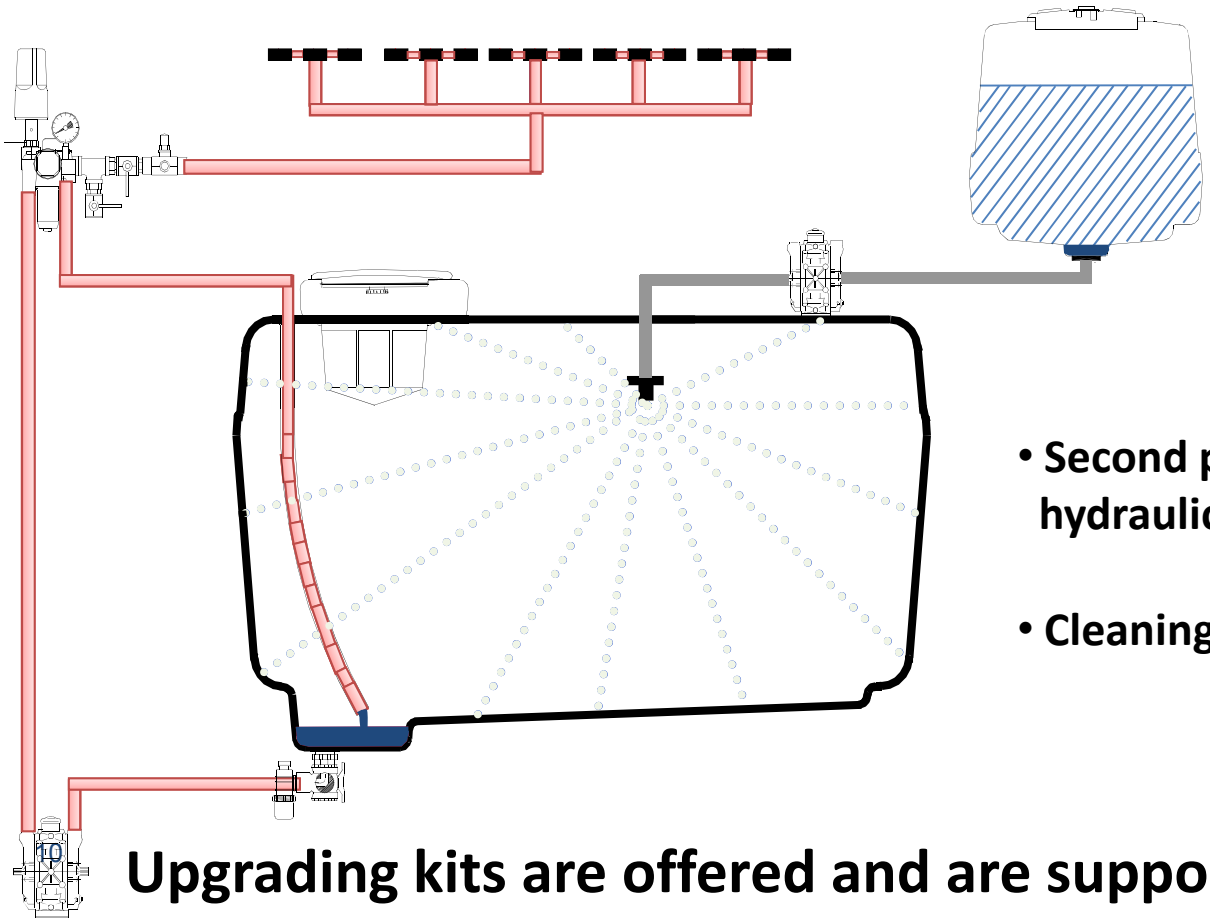


3 rinsing steps in the field

Triple rinsing mostly need to be done manually (stepping down from the tractor cab).

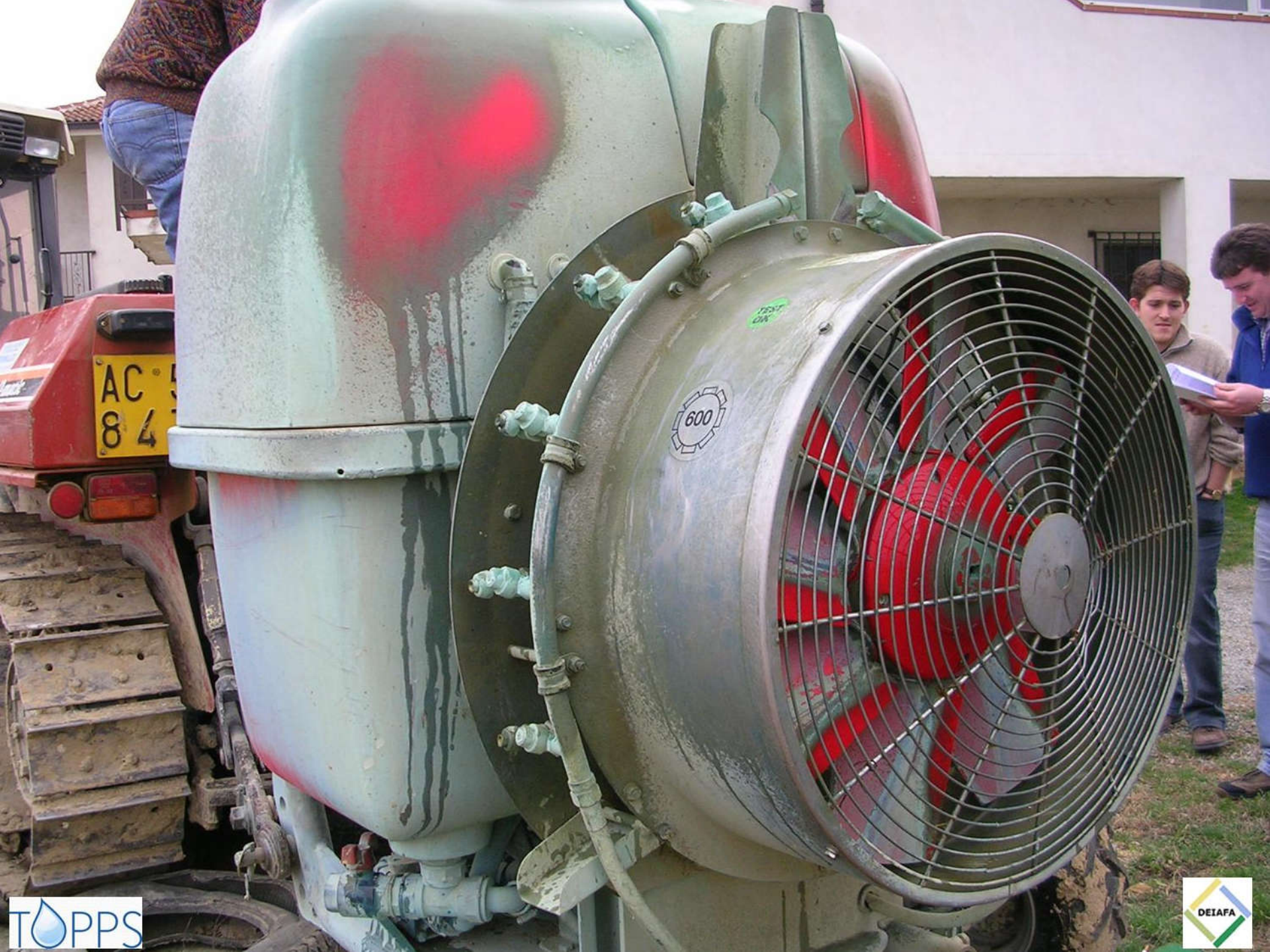
Example: Inside Tank Cleaning

Continuous cleaning / rinsing upgrading kit



- Second pump: electric / hydraulic
- Cleaning device inside

Upgrading kits are offered and are supported regionally in DE and CH / included in some new sprayers


600

Example: Outside Sprayer Cleaning

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)

Risk mitigation: Outside cleaning device for cleaning in the field and sprayer design

Example: Mixing & Loading

85 % fill sprayers on the farmyard

TOPPS farmer survey

- Be prepared for spills
- Filling place with no connection to water
- No filling on hard surface if spills cannot be collected
- Use risk reducing technology (Induction hopper, direct filling devices)
- Farm structure develops to bigger farms – this means longer travels to the field. Filling in the field can be a risk reduction measure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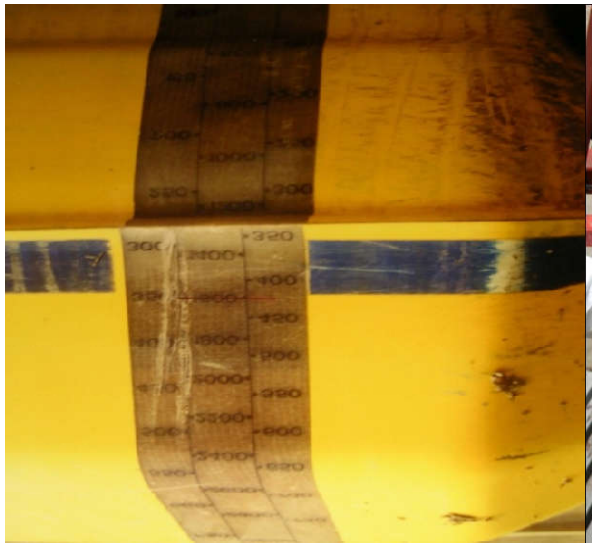
Example: Mixing & Loading

BMPs

- Use induction hoppers
- Avoid spills / contain them
- Improve water metering

  (Tank scales often not sufficiently precise or difficult to read)
- Calibrate sprayer for correct spray volume / ha



Example: Mixing & Loading

Avoid tank overflow

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

Technical installations can reduce the risk of tank overflow:

- **„Tank- full“-alarm**
- **Filling from an intermediary tank with defined water volume**
- **Flow meter with automatic water shut off**

What to do with left over spray solution or contaminated water?

- Residual volumes can be collected in the slurry tanks (DK, DE some Federal States).
- Residual volumes can be collected and treated in a biobed/biofilter(biological degradation – UK, BE, FR, SE).
- Residual volumes can be collected and applied in the field if dilution rate is < 2% of the spray solution.– DK (FR < 1%).
- Residual volumes can be collected and treated by chemical or physical methods

Check local recommendations / regulations vary significantly across regions / countries

Example: Remnant Management

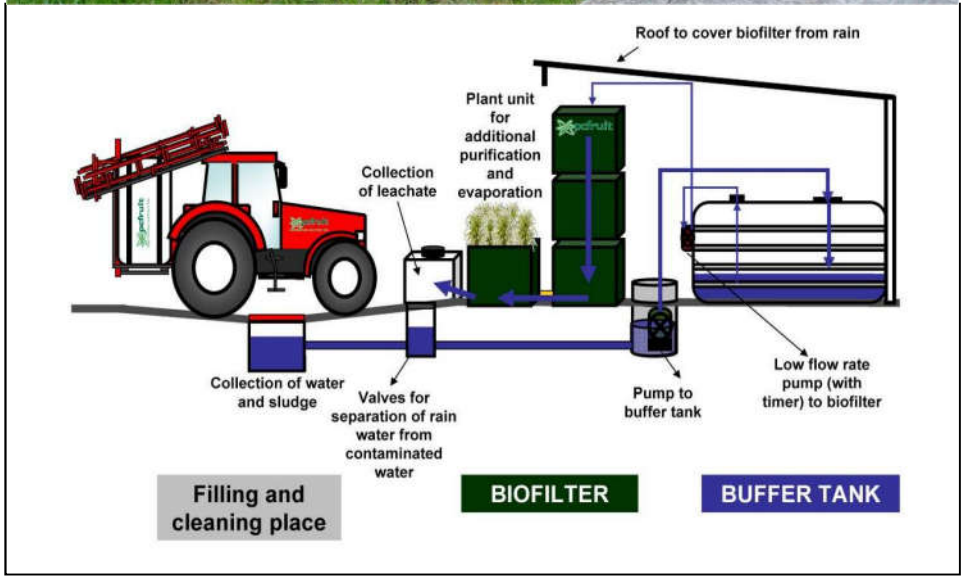
BMPs

- **Collect remnants from**
  - **Cleaning of equipment**
  - **Maintenance of equipment**
  - **Other remnants**

- **Treatment of remnants**
  - **Apply as a dilute spray in the field**

OR

  - **Treatment in a biofilter or other systems (e.g. Phytobac, Heliosec, Sentinel)**



Implementation: Where are the hotspots?

Point source mitigation is presumably linked to the number of sprayers used:

FIELD SPAYERS USED	
Country	Number: 1000s
France	**196**
Italy	**170**
Poland	**155**
Spain	**148**
Germany	**126**
Greece	**49**
Ireland	**40**
Austria	**35**
UK	**33**
Hungary	**30**
Total EU	**1.300**

Bush & tree SPAYERS USED	
Country	Number: 1000s
Italy	**400**
Spain	**200**
Greece	**104**
France	**100**
Germany	**42**
Portugal	**28**
Poland	**22**
Austria	**20**
Hungary	**15**
Slovenia	**7**
Total EU	**960**

Source: SPISE 6: EU Workshop Barcelona Sept 2016

Implementation: Aspects for technical improvements

Technical improvements take time and money

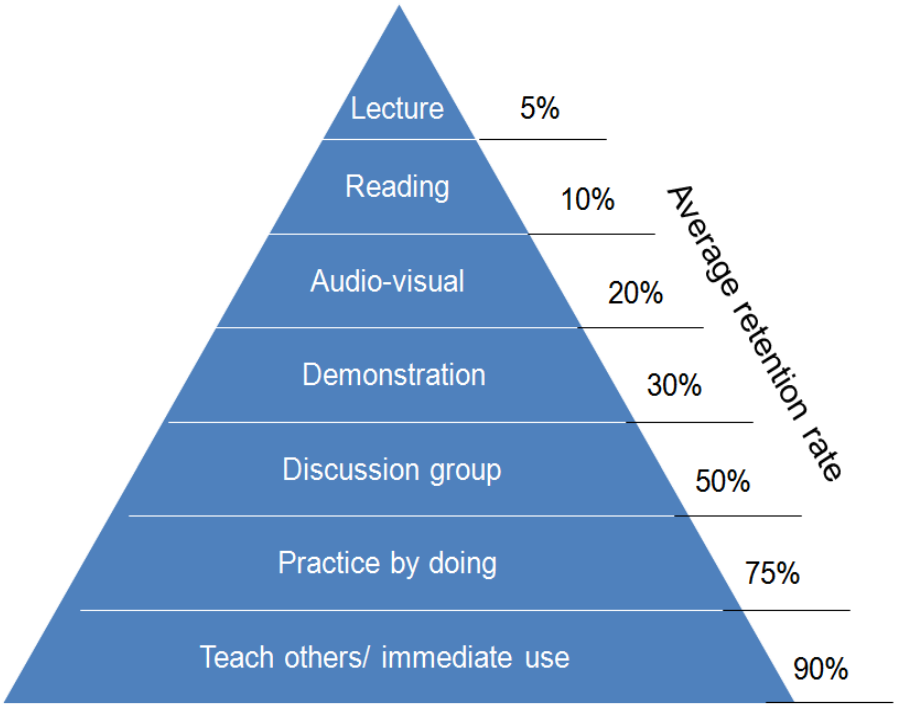
- Average age of sprayers 13 to 15 years (TOPPS surveys 2008)
- Technical status varies strongly among countries (how many carry a freshwater tanks ?)
- Sprayer manufacturers very diverse: small and big enterprises (> 600 in EU ?)
- Component suppliers (> 2000 ?)
- Required standards are sometimes not met.

Top priority BMPs to focus with highest potential for water protection

TOPPS – stakeholder survey 2016 n=1161

- **Remnant management**
- **Sprayer Cleaning**
- **Spray drift reduction Bush & Tree Crops**
- **Sprayer filling**

… how are we doing dissemination?



Source: National Training Laboratories, Maine, USA

We cover main entry routes of PPP losses to water

- **Point sources**
- **Spray drift**
- **Runoff / Erosion**

Theory and practice

Personal interactions most effective: theory + practice

… **we also try to create interaction via the internet.**

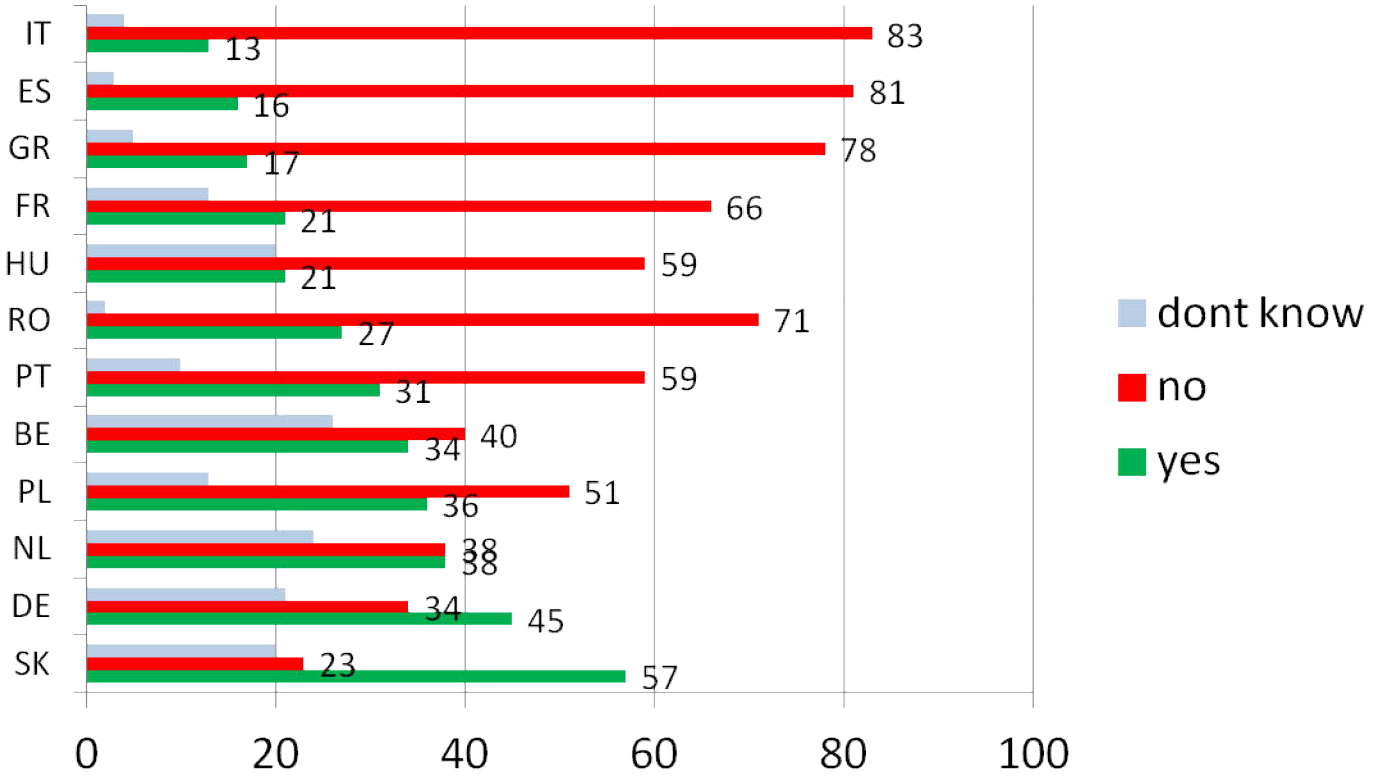
Example : Emmission scan currently tested in NL and BE

Example: Fyteauscan (BE); Emmission scan (NL)

- **Online checklist on practices concerning point source pollution**
- **Feedback on recommended practices**
- **Consideration of local regulations**
- **Intend to include distribution and retail**
- **Intend to link questionaire with training requirements**

Implementation: Information Deficits

Do farmers get sufficient advice on correct adjustment and use of sprayers ? (% respondents)



APPLICATION TECHNIQUE IS A KEY MITIGATION ELEMENT TO REDUCE POINT SOURCES AND SPRAYDRIFT.

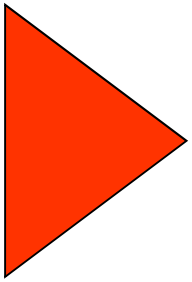
TRAINING, TRAINING, ……..

TOPPS survey 2016: n= 1161 (advisers, stakeholder , 12 countries)

Conclusion
Quick wins and low-hanging fruits

Risk mitigation opportunities need to be realised

Improved Equipment



Improved Infrastructure

- Rinse water tank (sufficient capacity)
- Internal and external cleaning device
- Better measurement of water volume
- Filling and container cleaning devices (Induction systems)
- Sprayer design should be optimized for lowest residual volume
- Filling and cleaning on farm require precautionary measures
- Clear recommendations on remnants management

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Water Protection

Water protection starts in the minds of people

Thanks for listening