GIS TOOLS: FIELD STUDY DESIGN AND AQUATIC RISK ASSESSMENTS

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Aquatic risk assessments at EU and Member State levels follow predefined frameworks for assessing the exposure of pesticides in surface waters. If the first-tier assessments demonstrate unacceptable risks to aquatic environments then higher-tier refinement options exist. This poster will present examples of:

- **Landscape analysis that can assist field study design and contextualisation of landscape risk assessments**
- **Higher-tier field studies for refining spray drift assumptions**
- **Catchment scale investigations and how they can be used to address Member State concerns and reduce the uncertainty associated with aquatic risk assessment**

1. Landscape analysis

First-tier aquatic risk assessments are conservative in nature. Landscape analysis can potentially increase the realism of an aquatic risk assessment and allow parameters in first-tier risk assessments to be challenged.

Basic assumptions associated with spray drift that can be challenged include:

- the proximity of water bodies to crop
- wind speed and direction
- vegetation interception
- drift percentiles entering the water body
- presence of aquatic macrophytes
- water body morphology

A landscape analysis can be used to investigate the relevance of the factors that are important for a particular GAP (e.g. high production areas).

Once the factors of importance have been determined then additional studies can be designed to generate data, which can then be fed back into the landscape risk assessment (Figure 1).

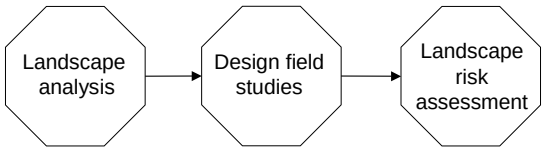

Figure 1 – Flow diagram of higher-tier study design and higher-tier risk assessments

Factors that may be investigated to refine the spray drift assessments include:

- Nature of intervening vegetation (height, width and porosity of buffer) – Figure 2.
- Directional analysis of wind in relation to crop (Figure 3).
- Proximity analysis of crop to water bodies (Figure 4).

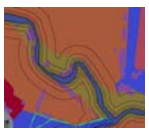

Figure 2 – vegetation analysis of buffer strips

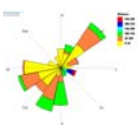

Figure 3 – Vector analysis

Figure 4 – Proximity analysis

2. Higher-tier field studies

First-tier aquatic risk assessments use predefined drift percentiles to calculate exposure of pesticides to surface waters.

In order to refine the spray drift assumptions it is important to:

- Provide robust deposition data for typical usage scenarios.
- Evaluate differing levels of mitigation incorporating vegetative buffers of different height and widths.

Figure 5 – Field sites

This can be achieved by:

- Identifying a suitable field site using landscape analysis techniques in Section 1 (Figure 5 and 6).
- Growing different buffer vegetation adjacent to a crop and placing artificial water bodies behind the buffer zones to investigate the effect of typical buffer morphology on spray drift deposition (Figure 7).

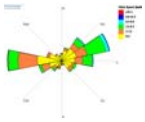

Figure 6 – wind vectors

Higher-tier spray drift studies can be used to refine first-tier assumptions and:

- Calculate more realistic predicted environmental concentration (PEC) in surface waters, which are representative of the proposed GAP and the landscape where the chemical will be used.
- Determine how rapidly the chemical will be dissipated in sediment/water systems (chronic exposure).

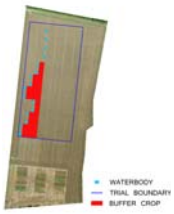

Figure 7 – Field site

3. Catchment monitoring studies

Monitoring studies can be a supplement to landscape risk assessments

- Identification of vulnerable catchments can be conducted using vulnerability index methodology.
- Discrete catchments allow chemical monitoring to be conducted following actual GAPs .

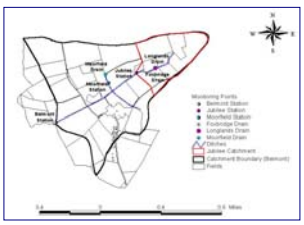

Figure 8 – Catchment

- Monitoring of surface waters that are adjacent to crops in discrete catchments with known inputs allow the real exposure to be investigated (Figure 8).
- Magnitude, duration and frequency of detects can be measured and related to source (spray drift, run-off and drainage) and compared with modelled predictions.