

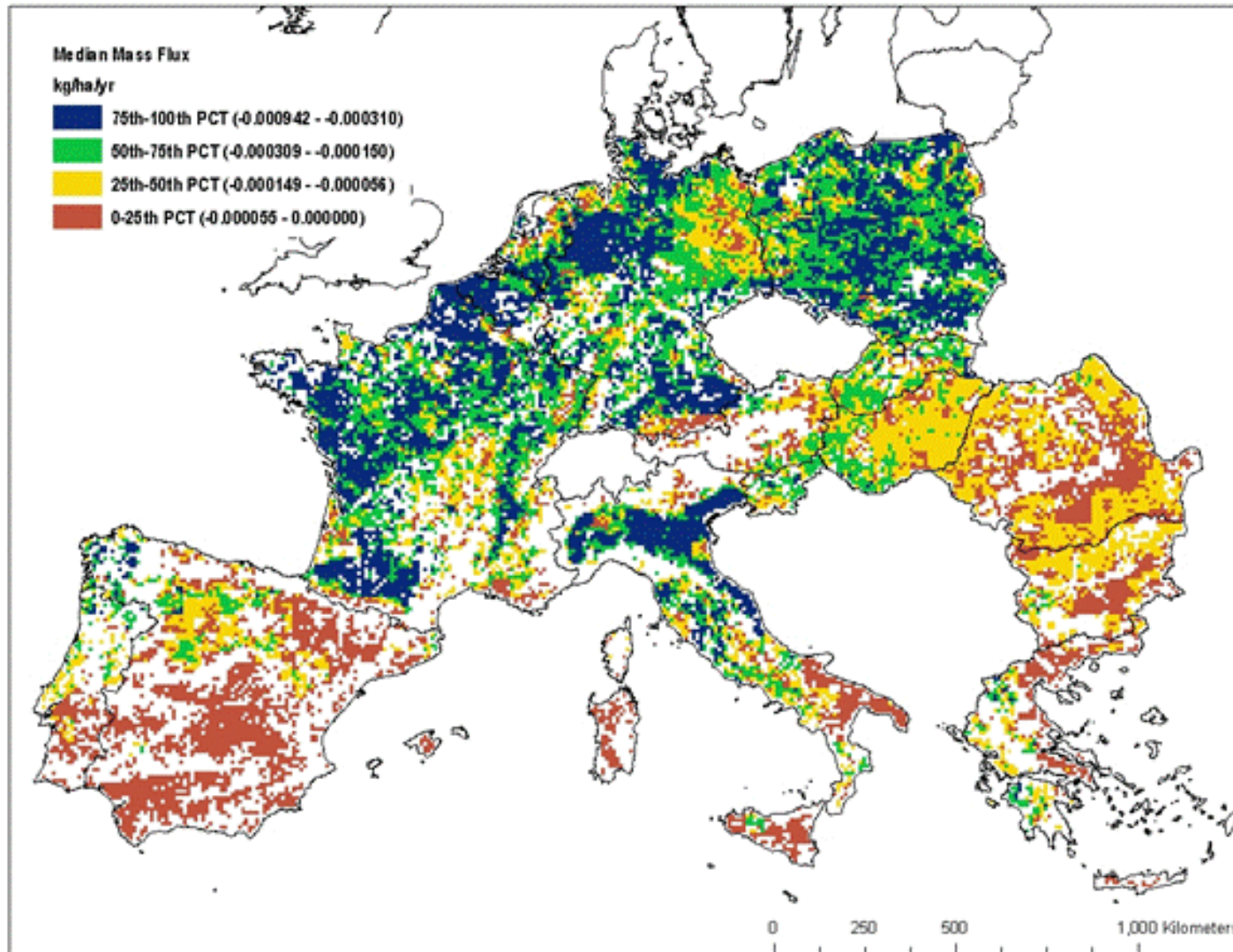


Distributed modelling an Industry Perspective

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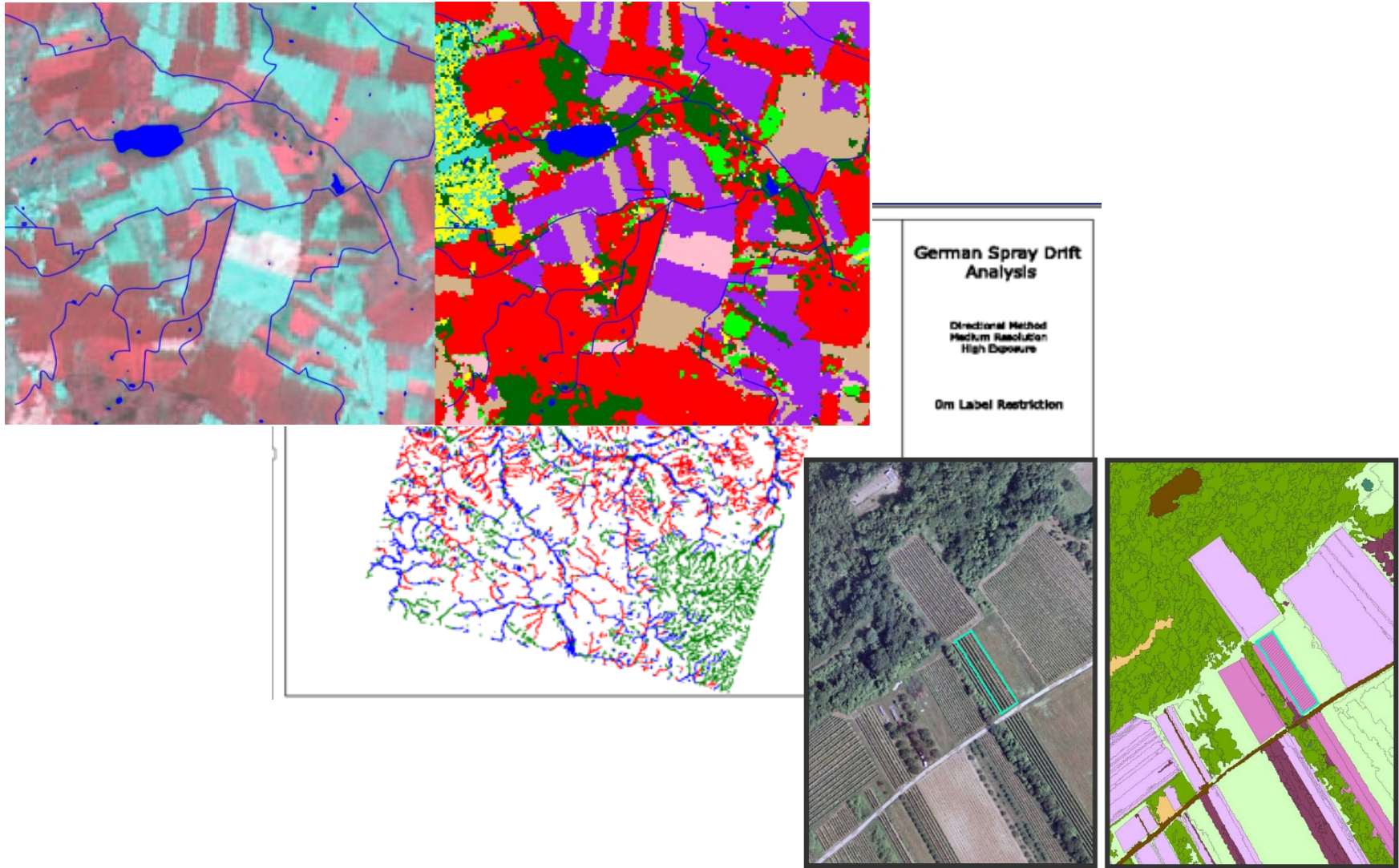
Product Safety

Industry Have been Conducting Distributed Modelling for Some Time



Not only
distributed
modelling of
leaching

Wide Application for GIS and Exposure Calculation



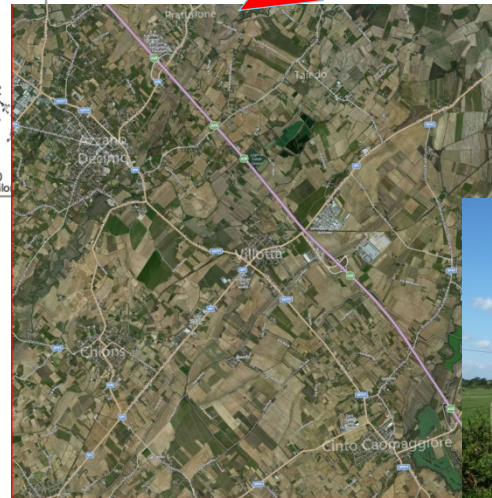
What is the Motivation for these Approaches?

- To better estimate predicted environmental exposures in realistic landscapes – often to inform internal decision making.
- Simple exposure calculations are conservative and protective of landscapes, but sometimes they are overly conservative
- Need to reduce complexity
 - Selection of monitoring sites
 - Placement of monitoring locations within a distribution
 - Understanding potential impacts of restrictions

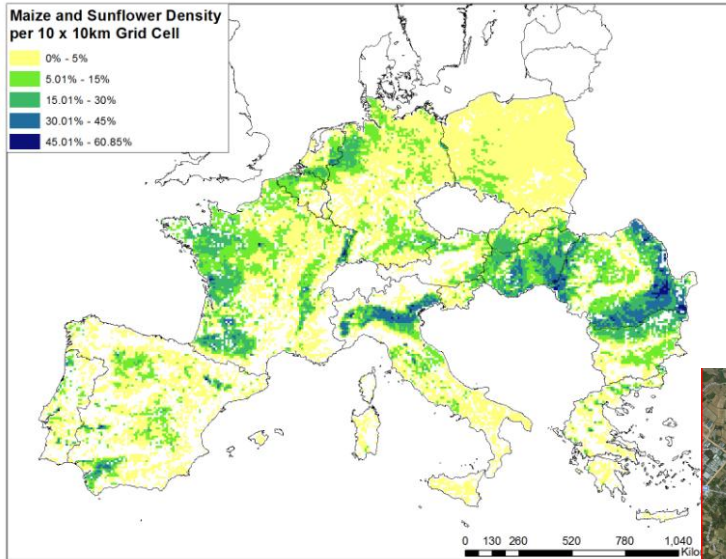
Identification of Monitoring sites

Maize Density in EU27 > 13mio ha with highly variable density of occurrence. Pre 2012 we did not even know where maize was grown on a consistent basis

Local

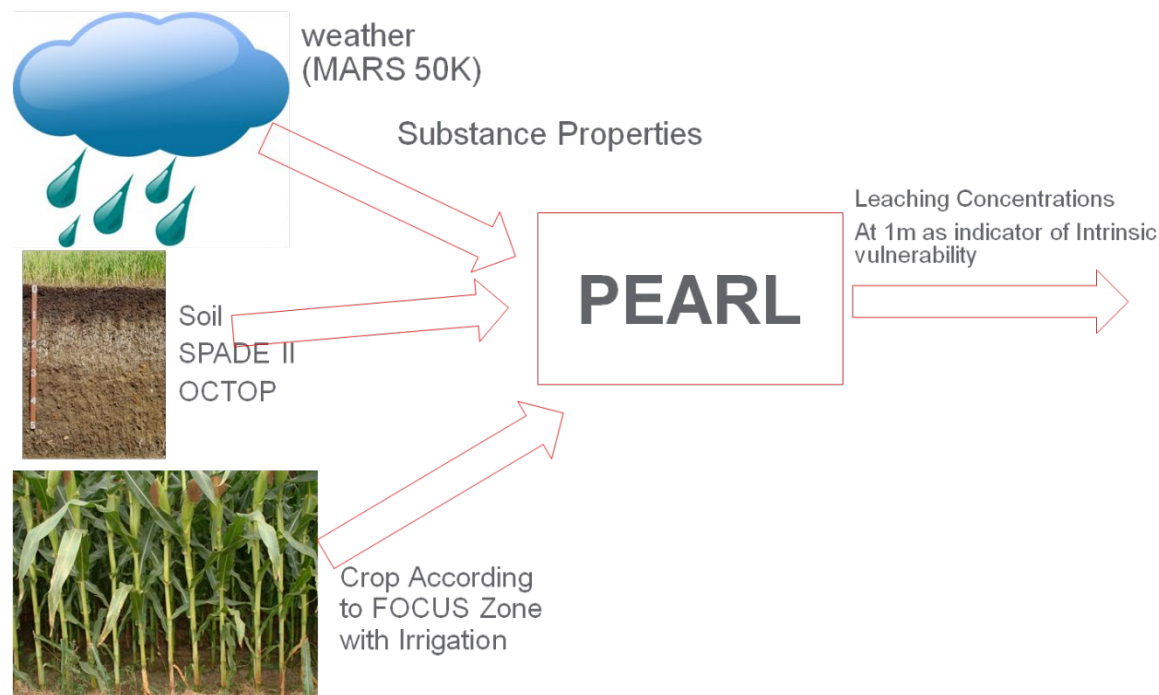


Field



Problem Definition

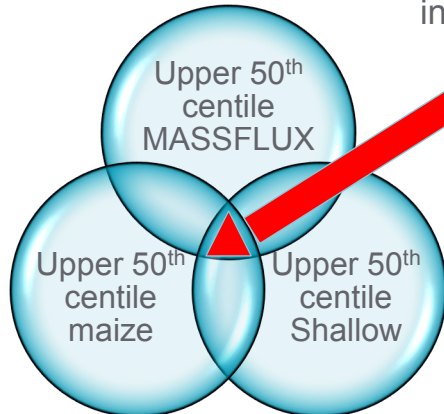
- Identify fields in vulnerable areas with > 3 in 5 years of product use located above shallow groundwater ($< 10\text{m}$ deep) avoid areas with $> 5\% \text{OC}$
- What does vulnerable mean?



Models integrate weather/Soil/Cropping to produce relative estimates of leaching. But accuracy of model estimates are dependent upon the quality of the data

Identification of Sites

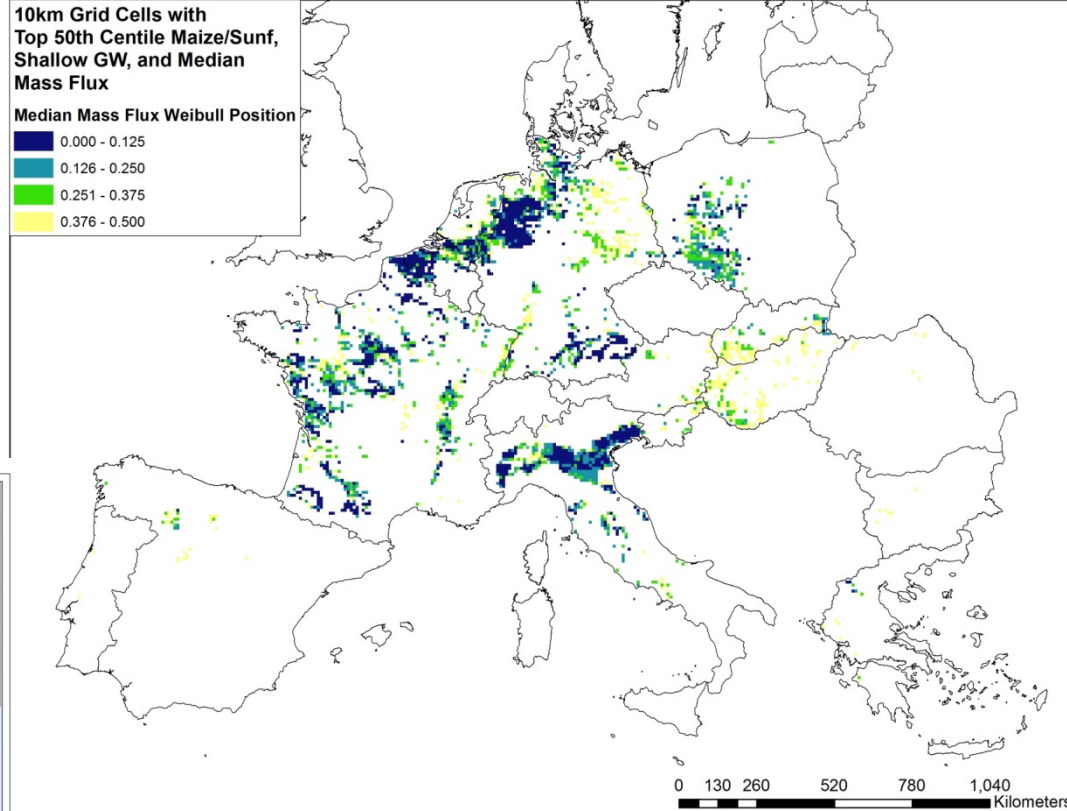
“Most likely” regions for
identifying fields



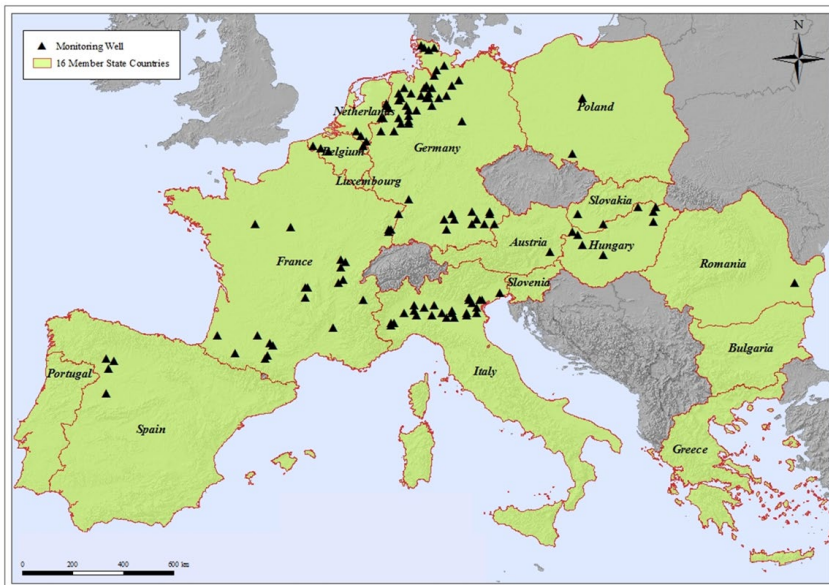
10km Grid Cells with
Top 50th Centile Maize/Sunf,
Shallow GW, and Median
Mass Flux

Median Mass Flux Weibull Position

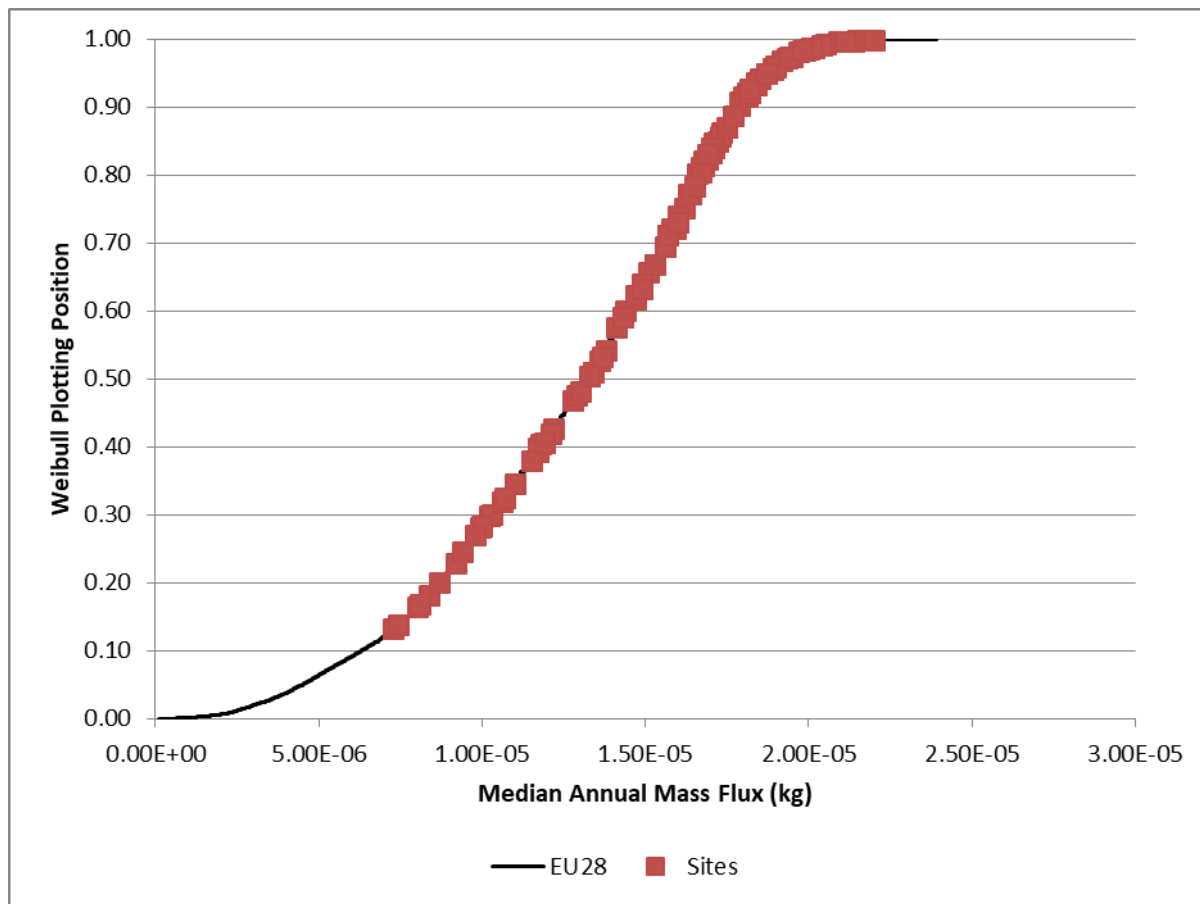
- 0.000 - 0.125
- 0.126 - 0.250
- 0.251 - 0.375
- 0.376 - 0.500



125 monitoring sites selected at random

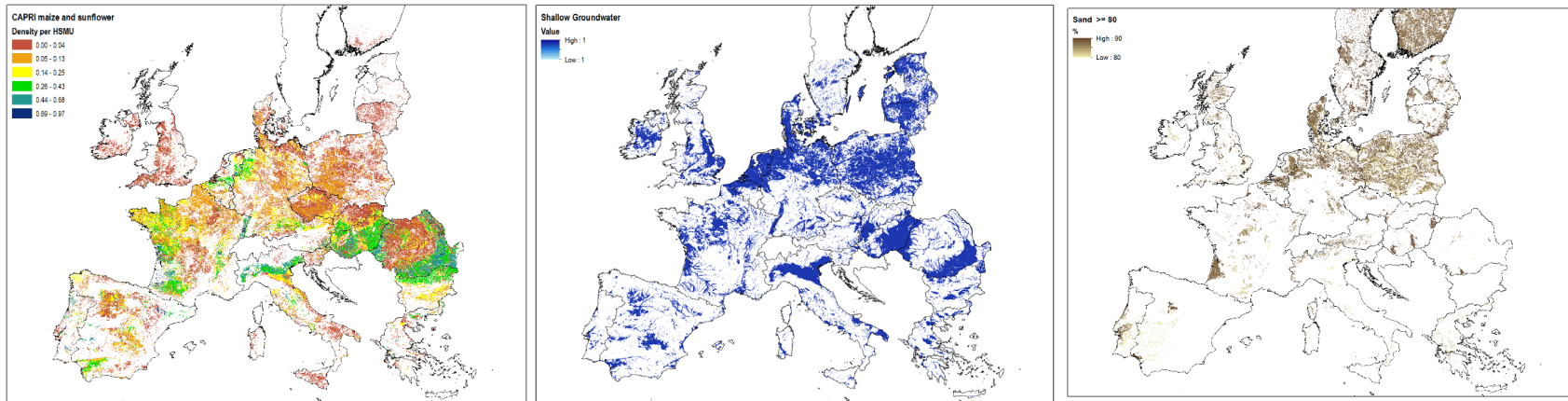


Placing Identified Sites in Context of a Landscape



What is the Extent Sandy Soils in EU

- What is the co-occurrence of Sandy soils and shallow groundwater



Crop

Shallow groundwater

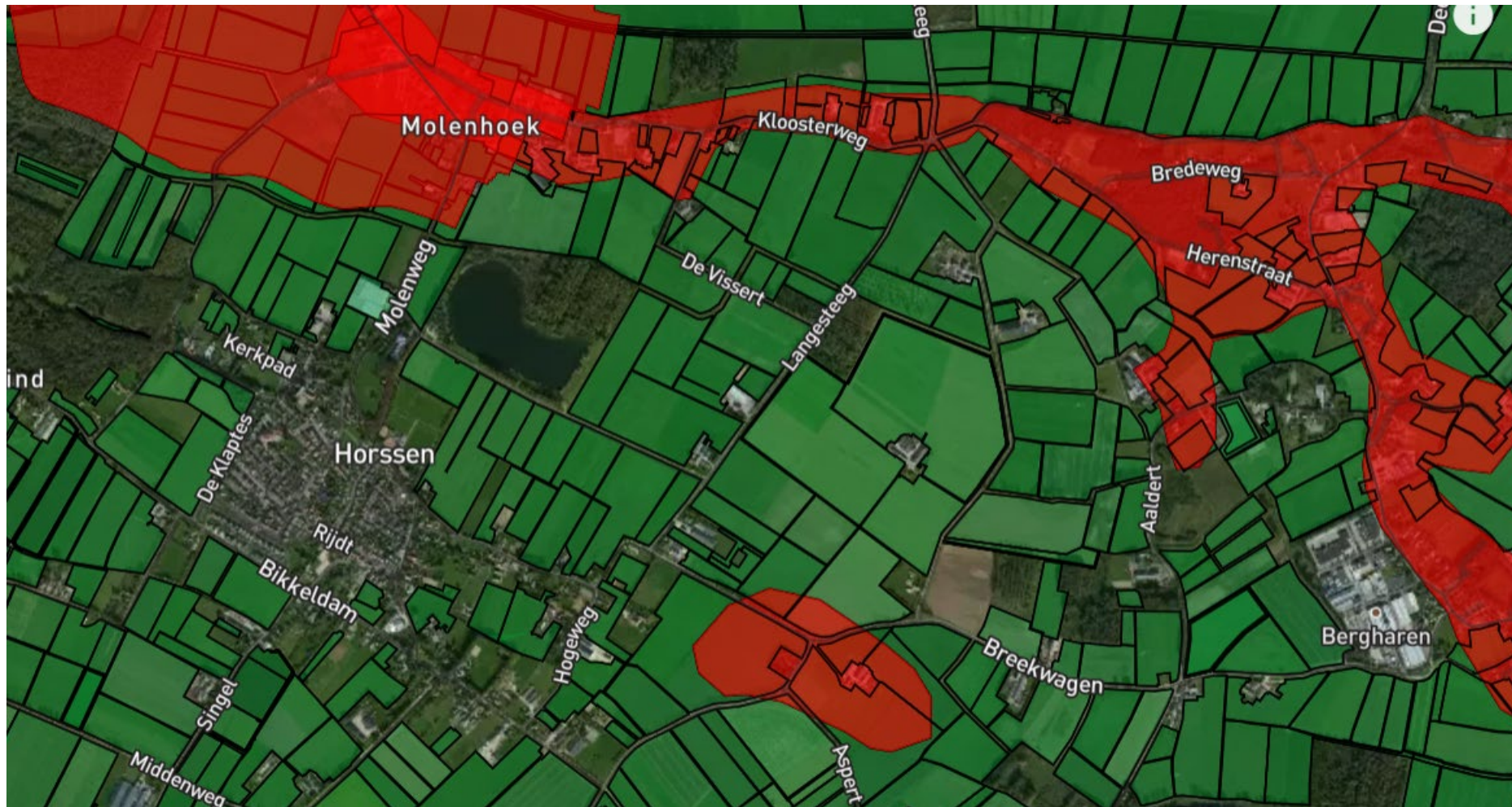
Soil

These data will only be able to provide an ***approximate estimate*** of the potential area affected. It is good enough for prioritisation

Maize/Sunflower Production on Sandy Soils

Member State	Estimate of % Maize and sunflower Area impacted (including error)	Classification
Netherlands	>55%	Potentially Impacted
Poland	20 - 40 %	Potentially Impacted
Belgium	>30%	Potentially Impacted
Germany	15 - 30%	Potentially Impacted
Italy	4 - 8 %	Potentially Impacted
France	<4%	Potentially Impacted
United Kingdom	2 - 4%	Potentially Impacted
Slovakia	1 - 2%	Potentially Impacted
Austria	<1%	Potentially Impacted
Ireland	<1%	Potentially Impacted
Luxembourg	<1%	Potentially Impacted
Slovenia	<1%	Potentially Impacted
Hungary	4 - 8 %	Excluded <200mm winter rainfall
Portugal	2 - 4 %	Excluded <200mm winter rainfall
Czech Republic	1 - 3%	Excluded 1 in 3 year
Greece	<2%	Excluded <200mm winter rainfall
Romania	1 - 2%	Excluded <200mm winter rainfall
Spain	1 - 2%	Excluded <200mm winter rainfall
Bulgaria	<1%	Excluded <200mm winter rainfall

App for Farmers in NL



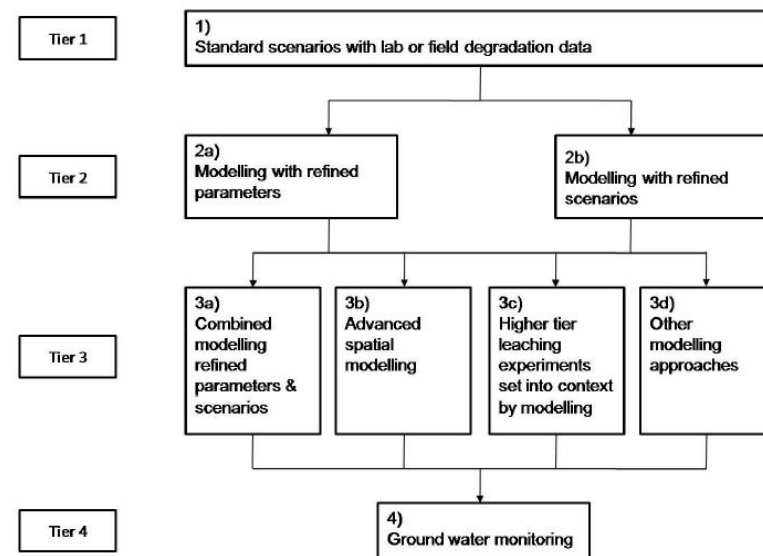
France RPG data: cropping at a field level



Can identify which crops are grown at a field level: higher level data are now becoming much more available making the range of application of distributed modelling much broader

Regulatory Acceptance of Distributed Modelling

- Advanced spatial modelling is an option at Tier 3b and is used to support monitoring at Tier 4 in FOCUS groundwater
- In practice it is rarely used at EU level
 - No clear guidance on parameterisation
 - No general acceptance on which data to use
 - No guidance on how to interpret results
- Routinely used by some MS e.g NL,FR,AT



* Mitigation possible at all tiers

Figure 1: Proposed generic tiered assessment scheme for groundwater (FOCUS, 2009)

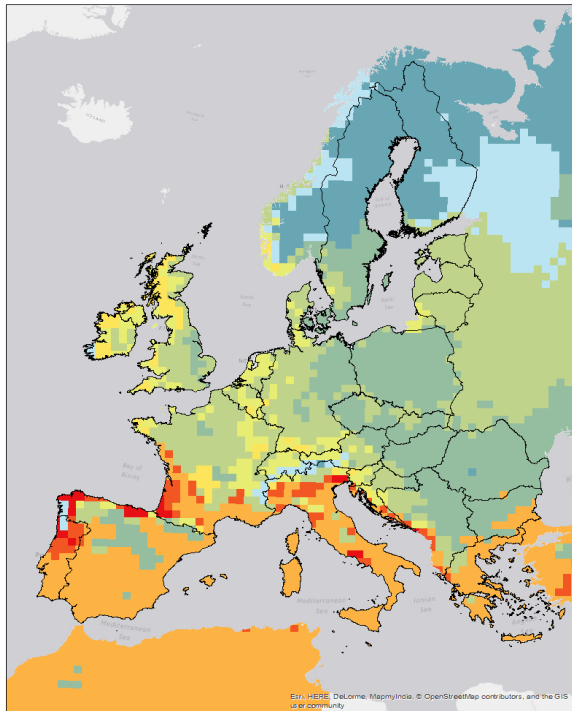
* FOCUS GW 2009 & UBA-TEXTE 56/2011 (Holdt et al. 2011)

SETAC EMAG Pest group have outlined how distributed modelling can be used to estimate vulnerability of monitoring sites

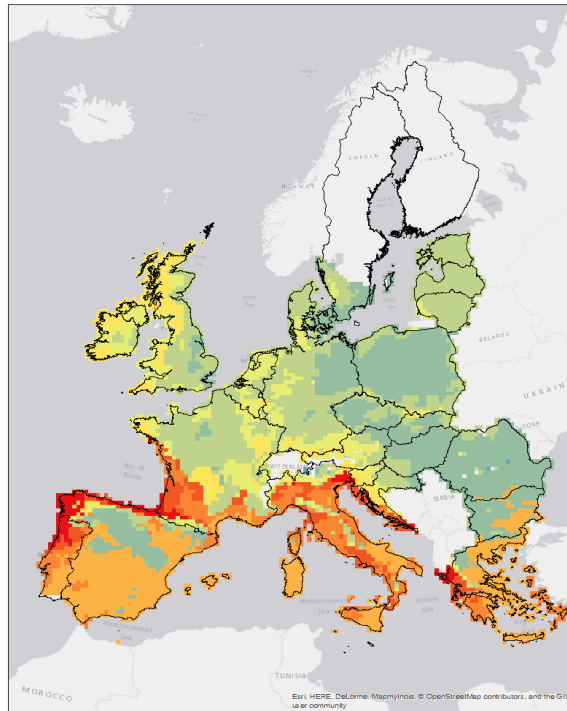
What Do We need to Gain Acceptance?

- Datasets that are QC'd where it is agreed that the data are representative of the use area

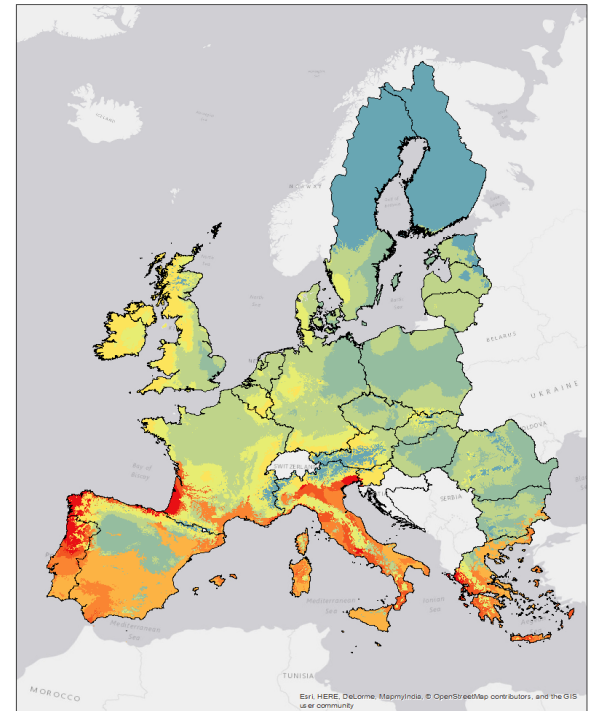
MARS 50km



MARS 25km



EFSA 1km



FOCUS zones determine application timing and Irrigation

Change of FOCUS Zone from MARS 50 to MARS25

Site Name	Member State	MARS25 FOCUS Zone	MARS 50 FOCUS Zone
7	Germany	Hamburg	Kremsmünster
8	Germany	Kremsmunster	Kremsmünster
12	Germany	Hamburg	Hamburg
13	Germany	Hamburg	Hamburg
44A	Germany	Hamburg	Hamburg
448	Germany	Hamburg	Okehampton
61	Germany	Hamburg	Hamburg
122	Germany	Hamburg	Kremsmünster
145	Germany	Hamburg	Hamburg
158	Germany	Hamburg	Kremsmünster
228	Germany	Hamburg	Hamburg
249	Germany	Hamburg	Hamburg
252	Germany	Hamburg	Hamburg
259	Germany	Hamburg	Hamburg
496	UK	Hamburg	Châteaudun
501	UK	Hamburg	Hamburg
512	UK	Chateaudun	Châteaudun
525	UK	Chateaudun	Châteaudun
537	UK	Hamburg	Hamburg
545	UK	Hamburg	Hamburg
548	UK	Hamburg	Hamburg
549	UK	Hamburg	Hamburg
560	UK	Hamburg	Hamburg
564	UK	Hamburg	Hamburg
580	UK	Hamburg	Hamburg
603	UK	Hamburg	Hamburg
623	UK	Hamburg	Hamburg
632	France	Thiva	Kremsmünster
647	France	Thiva	Kremsmünster
652	France	Thiva	Kremsmünster

Changes in MARS data changes assignment of FOCUS Zone

Conclusions

- Industry has used distributed modelling approaches for a long time often for internal decision making
- We are supportive of these techniques if they bring a greater understanding of realistic exposure in landscapes however their adoption is hindered by lack of guidance and hence regulatory acceptance.
- In order to be adopted more widely we need (Consistent with EU modelling workshop)
 - Agreed quality controlled datasets
 - Changes to datasets should not cause huge changes in outputs unless justified
 - VC of models and datasets that are used for distributed modelling
 - Guidance on how to interpret results of distributed modelling
 - Developing guidance in the area of leaching may lead to adoption for other areas of exposure assessment