

# Developing scenarios for the environmental risk assessment of veterinary pharmaceuticals at the European level

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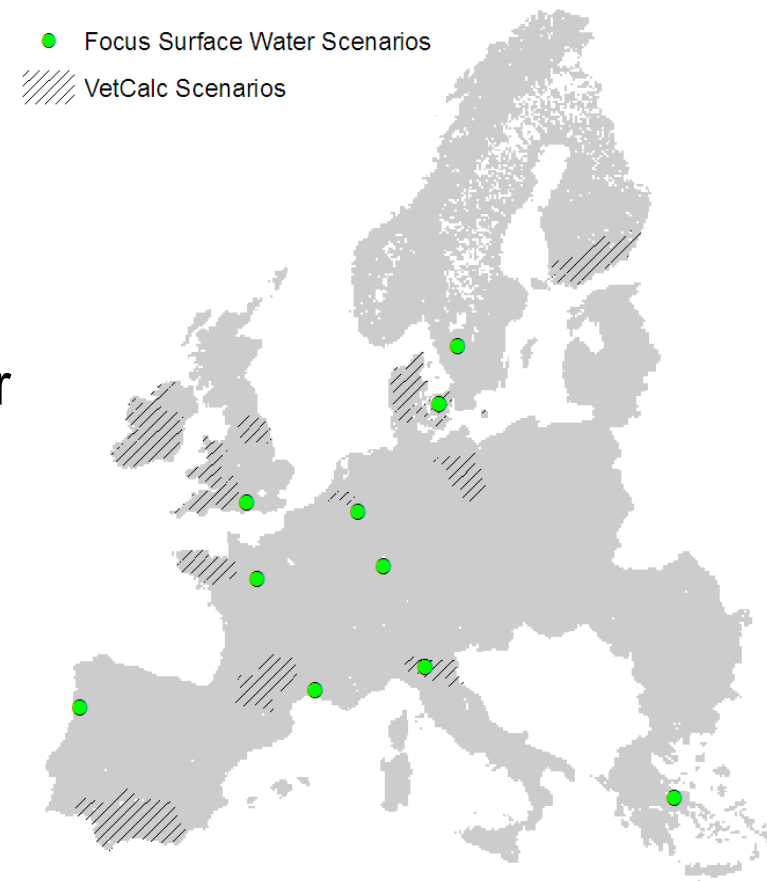
## Why using scenarios in risk assessment?

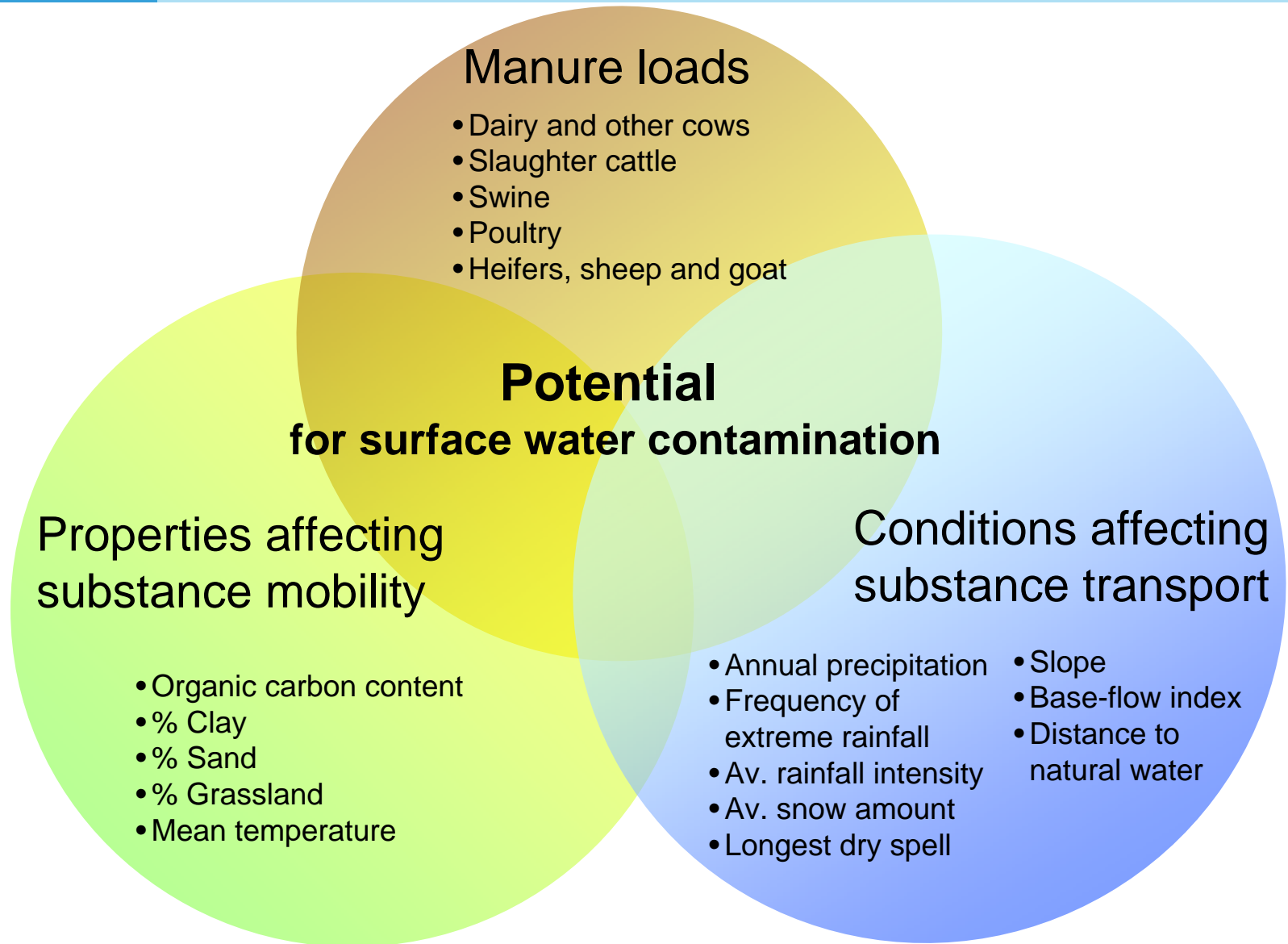
Scenarios **are** characteristic conditions, under which veterinary pharmaceuticals enter the environment.

Scenarios **help** to reduce the complexity of environmental conditions and exposure situations.

Scenarios **define** the conditions, for which detailed fate models should be parameterised.

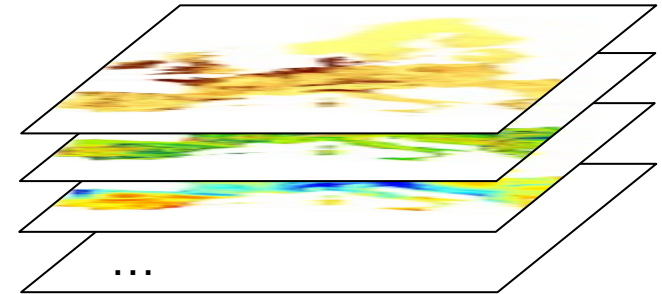
1. To select relevant risk scenarios for veterinary medicines in Europe.
2. To compare selection with existing scenarios.
3. To propose a set of new scenarios for the ERA process.
4. Scenarios should be georeferenced and comparable to each other.





# Schematic approach

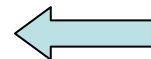
Mobility factors	
Organic matter content	% Grasland
% Clay	Mean temperature
% Sand	
Transport factors	
Annual precipitation	Longest dry spell
Frequency of extreme	Slope
Av. rainfall intensity	Base-flow index
Av. snow amount	Distance to natural water
Animal loads	
Dairy and other cows	Poultry
Slaughter cattle	Heifers, sheep and goat
Swine	



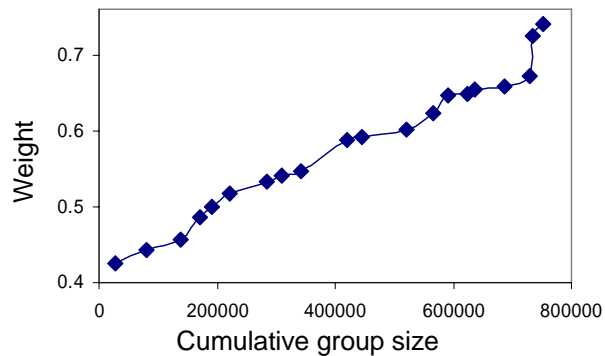
Cluster analysis



Groups of cells with similar characteristics:  
**Scenarios**



Weighting each cluster centre



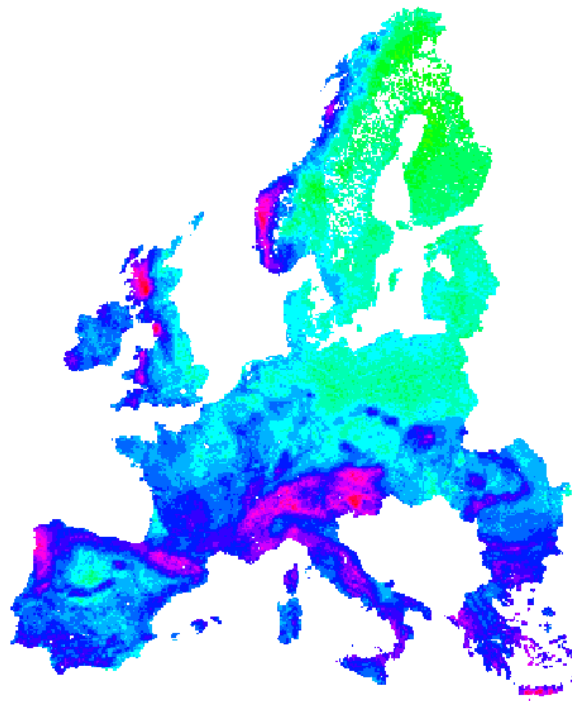
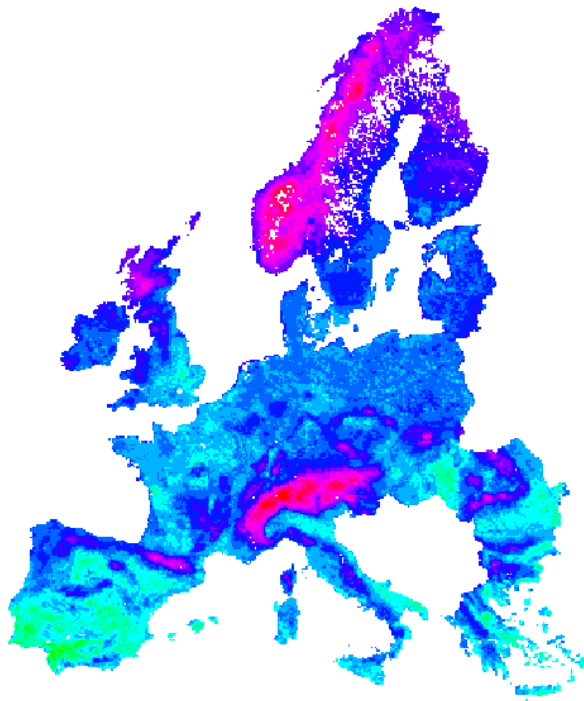
## Principal components of environmental variables

PC

1

2

3

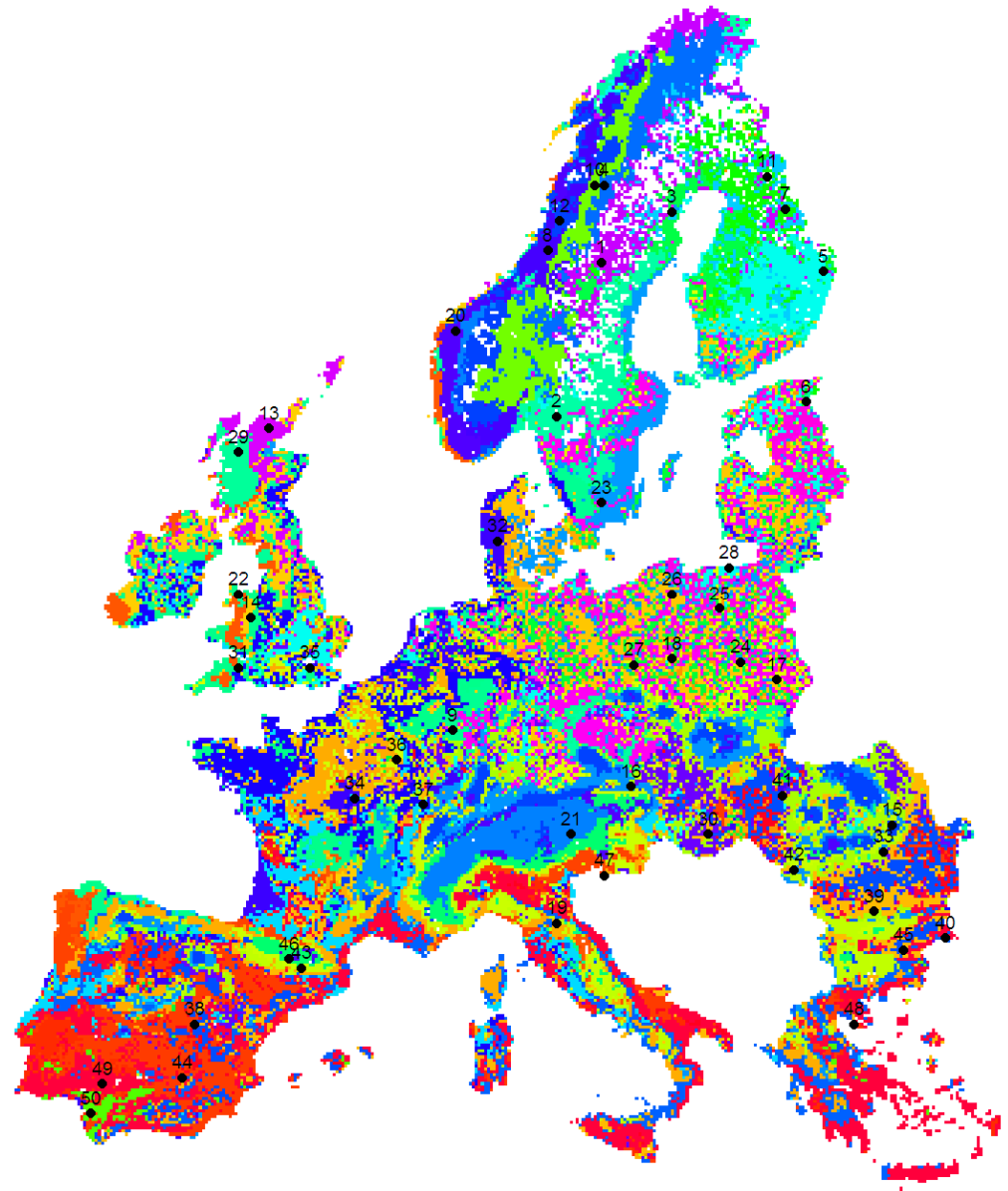


Explained variance: 27.5%  
Associated with: Slope, Temperature,  
Grassland

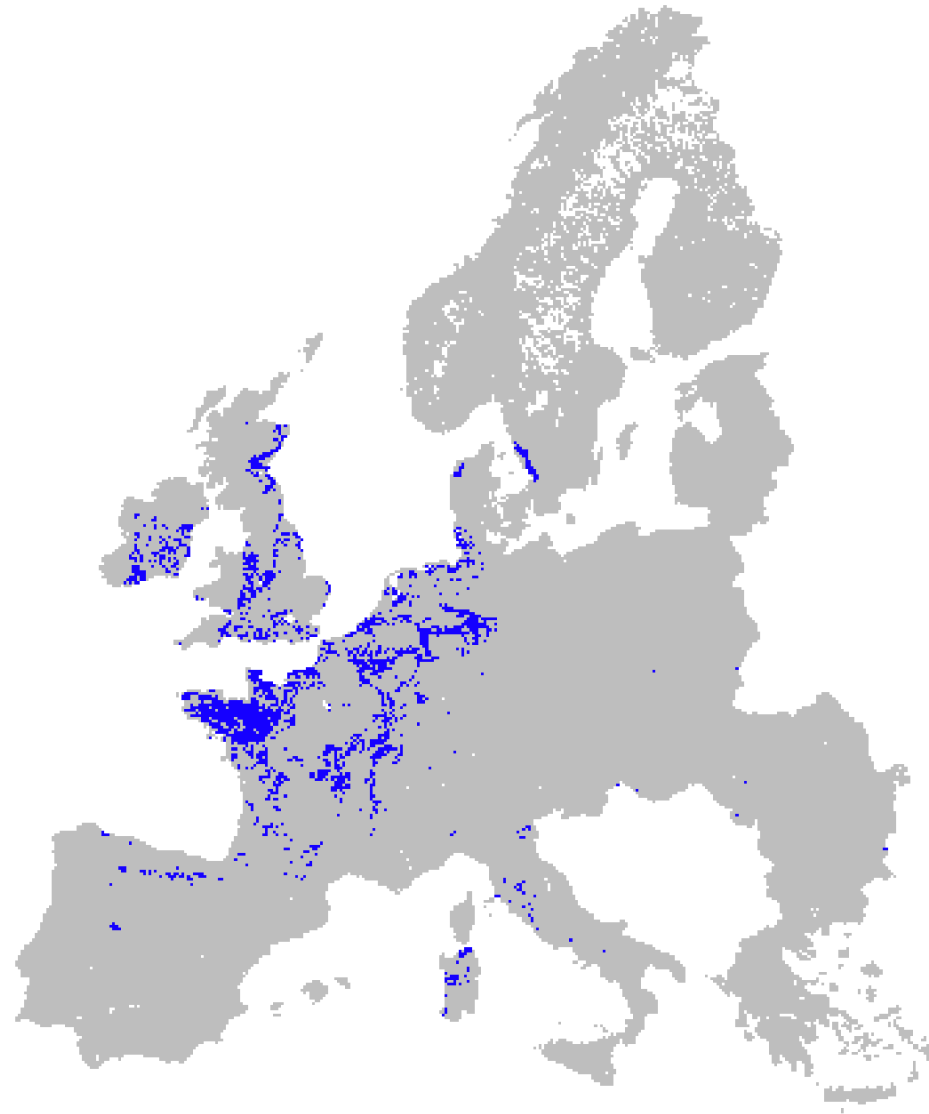
20.3%  
Rainfall

11.4%  
Soil properties

Based on 5 principal components:  
components:  
Explaining 74% of variance

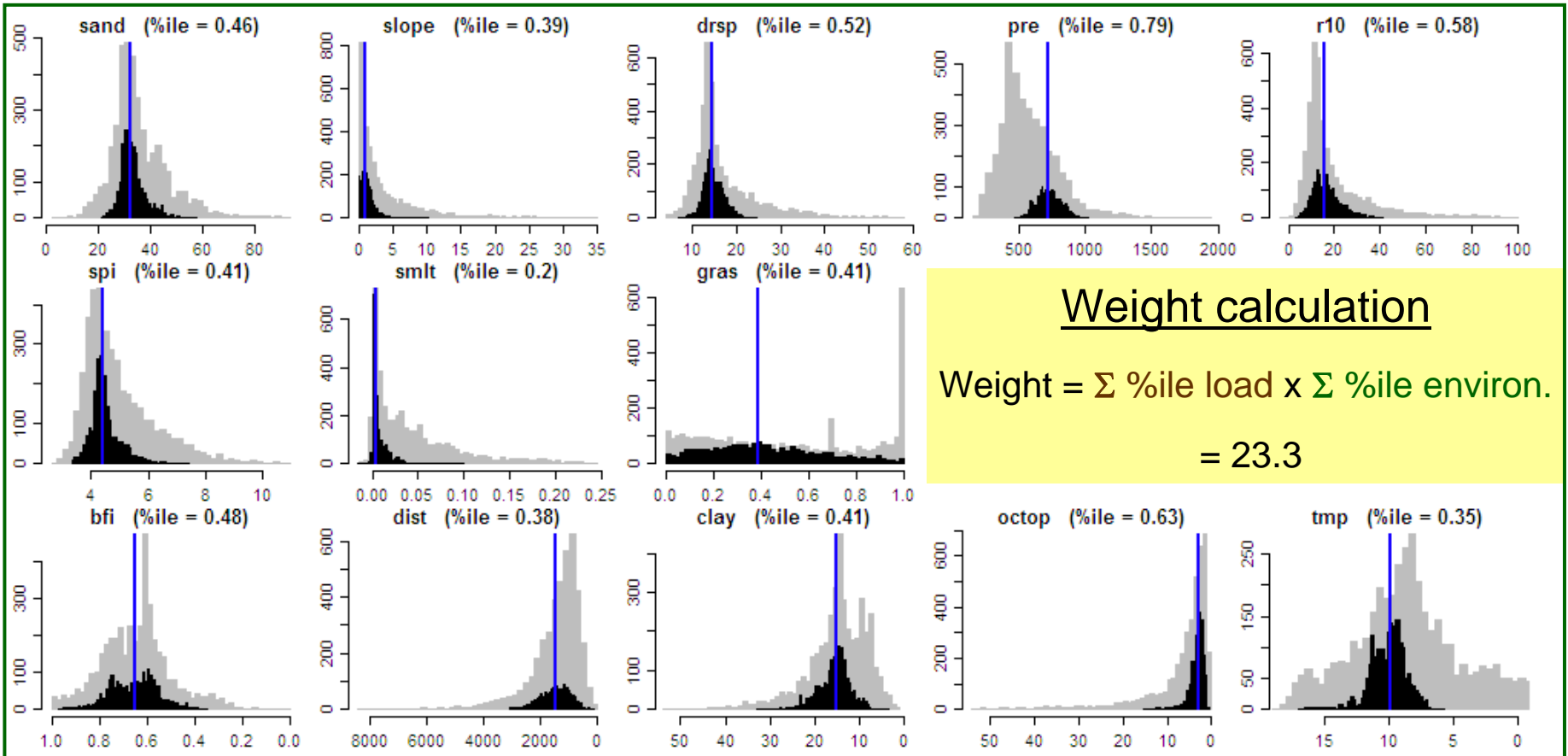
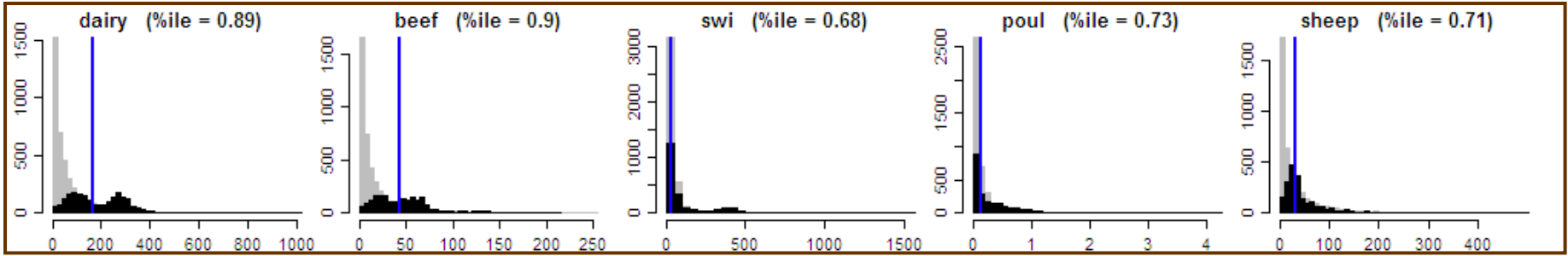


# Example cluster





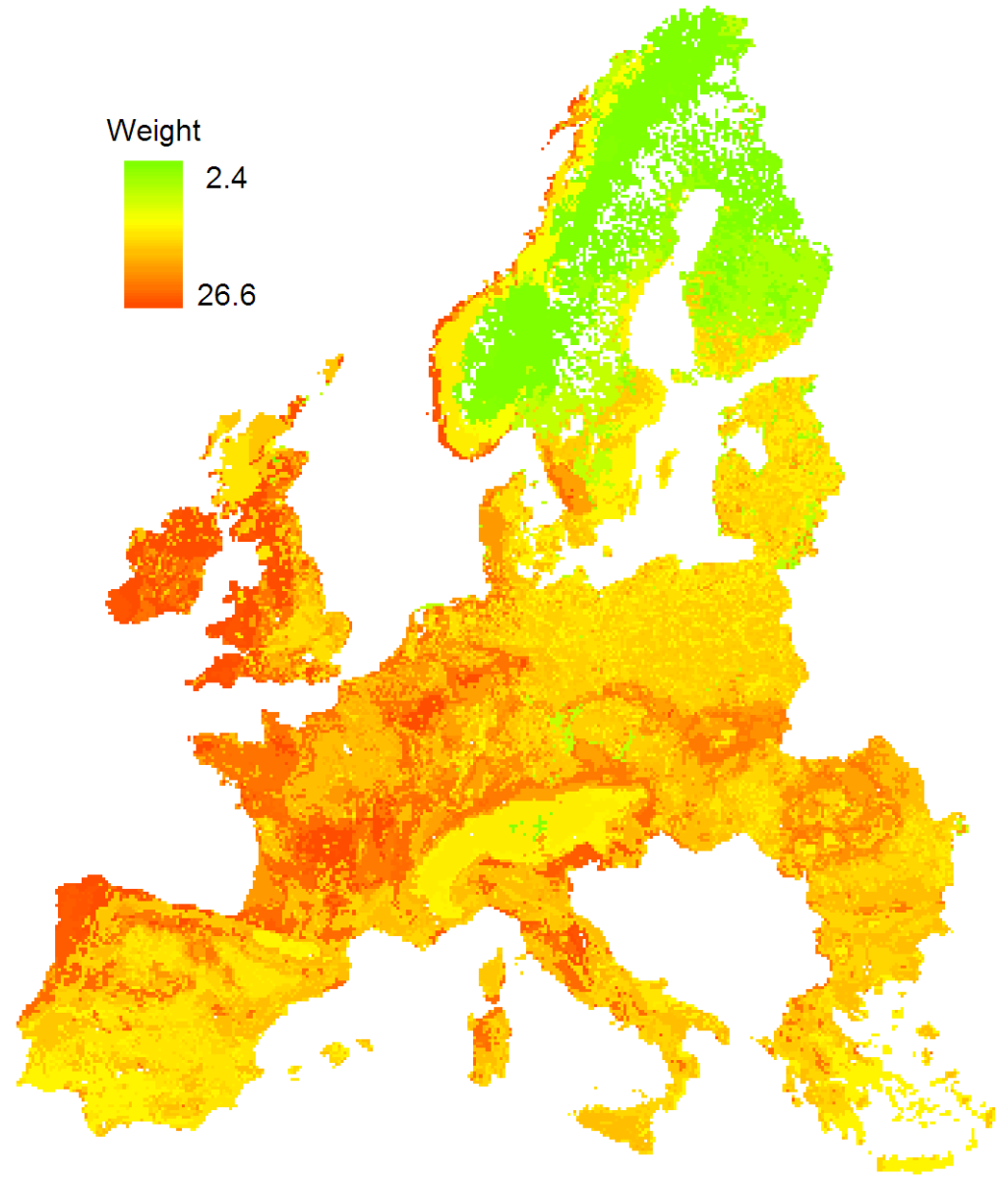
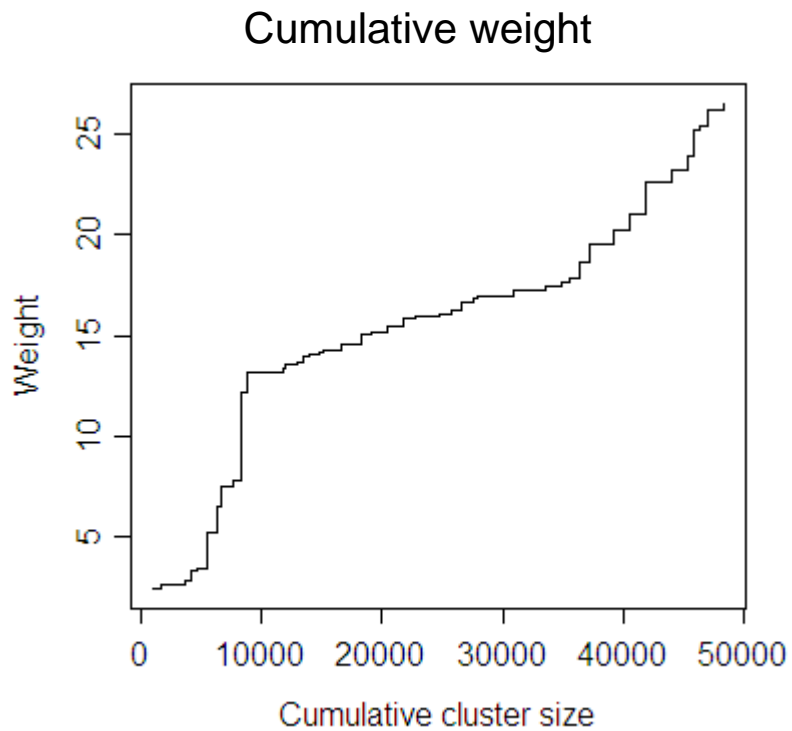
# Example cluster: variable values



Weight calculation

Weight =  $\Sigma$  %ile load x  $\Sigma$  %ile environ.

= 23.3



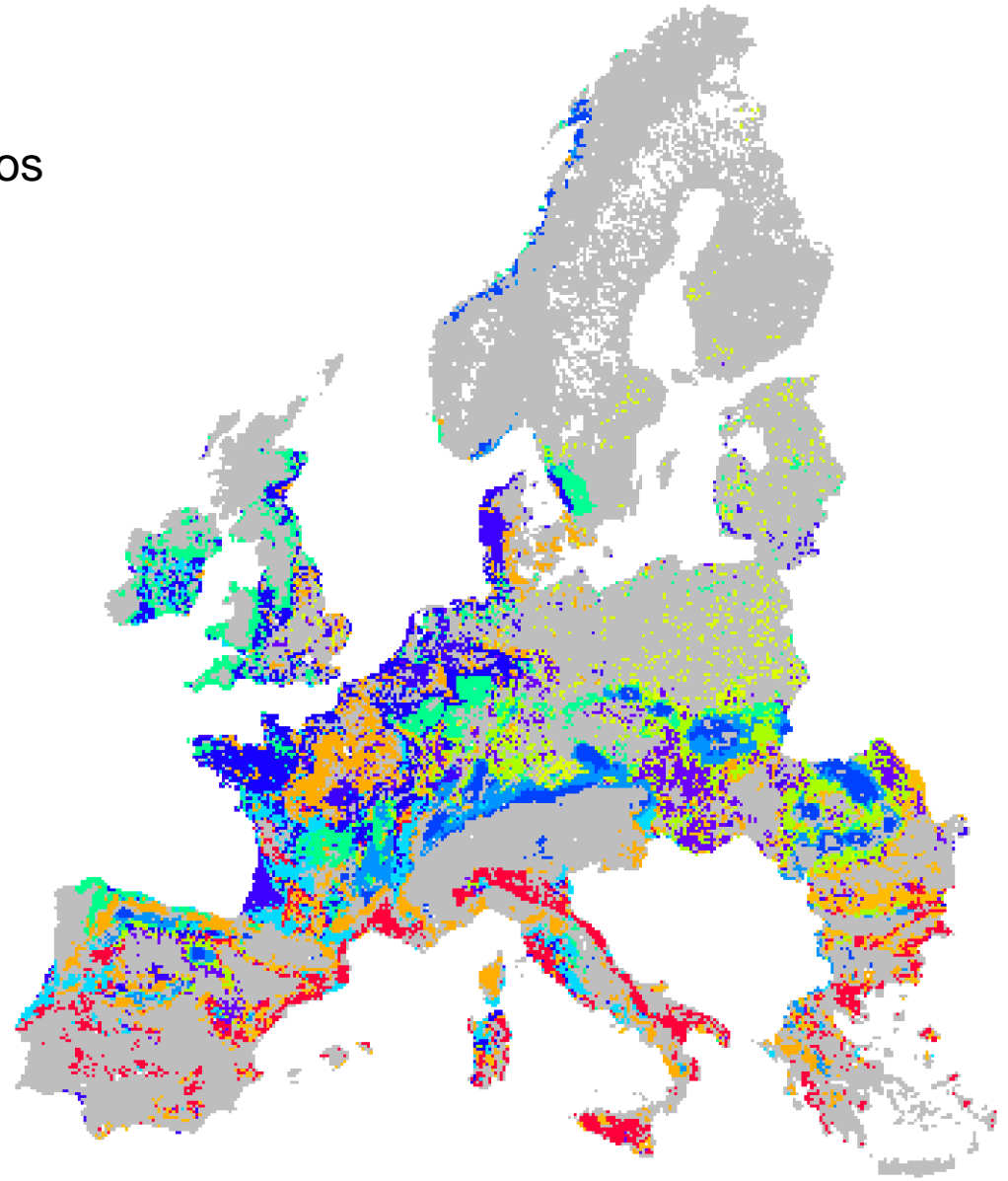
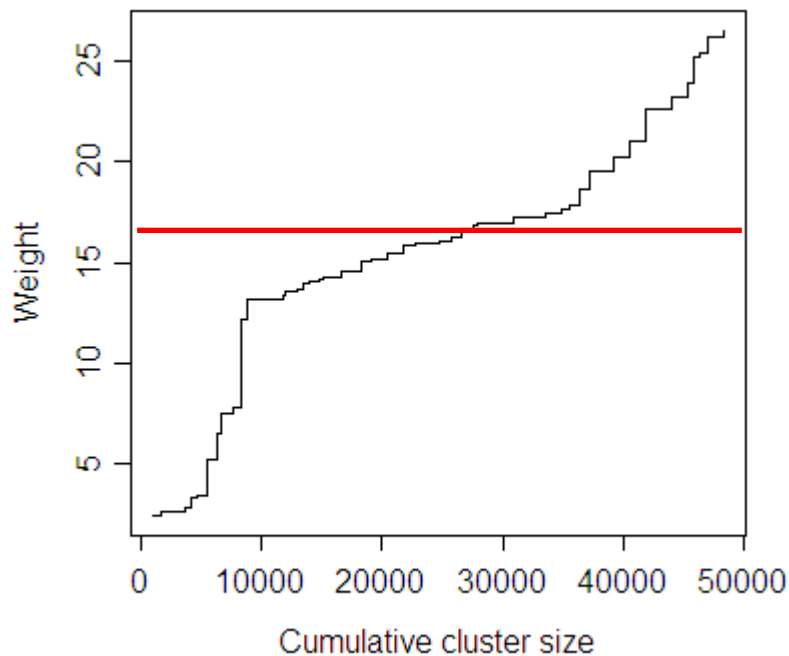
## Selection criteria:

Rank in top 40%

Size in top 60%



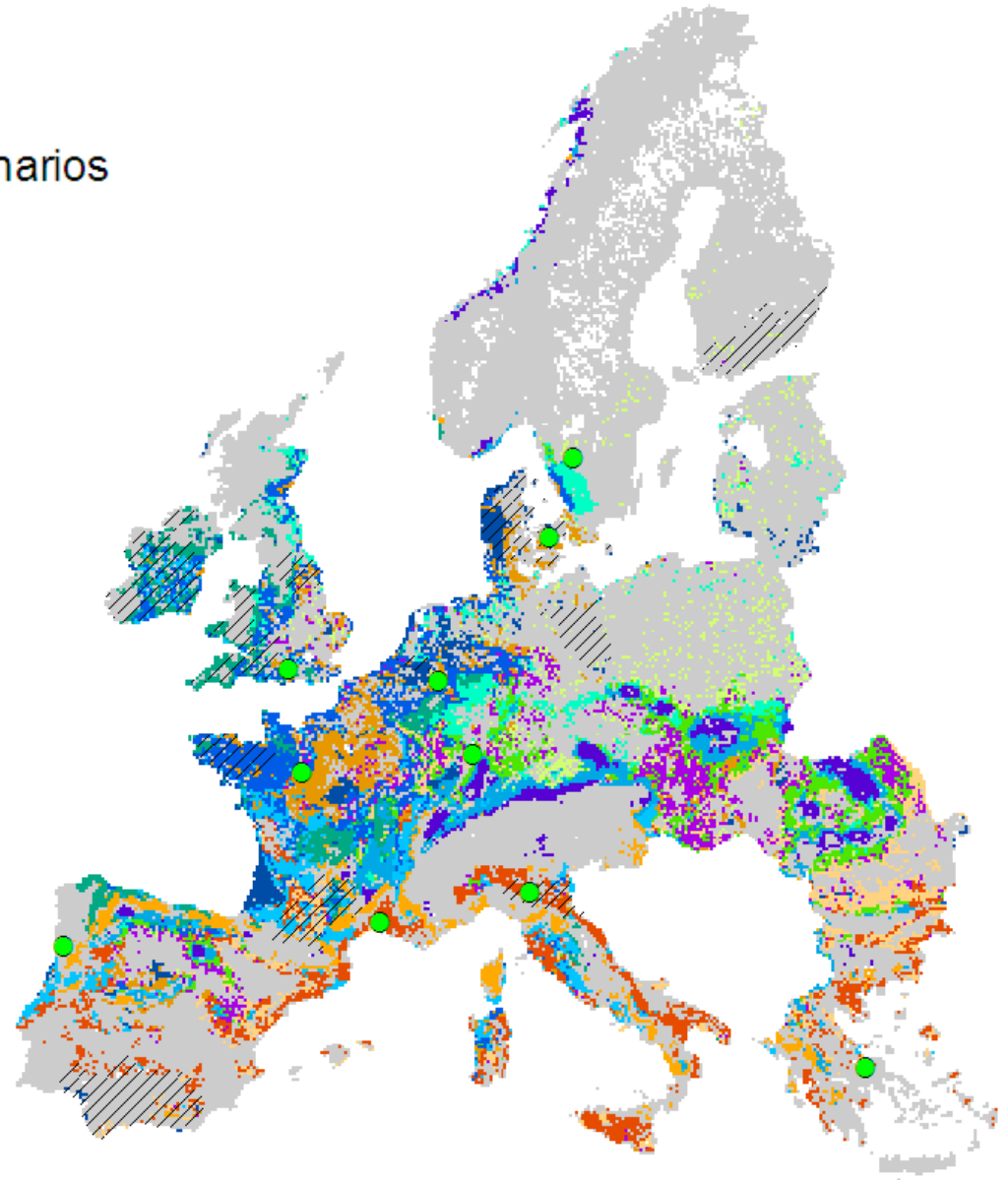
13 scenarios



# Comparison to existing scenarios

● Focus Surface Water Scenarios

//// VetCalc Scenarios



## Conclusions and next steps

- Clustering environmental variables and ranking the clusters with manure loads yields groups covering a wide geographical area.
- Some situations are covered by existing scenarios, but a number of new scenarios are identified.
- Parameterise the new scenarios for the ERA process of veterinary pharmaceuticals.
- Predict environmental concentrations of veterinary drugs for the new scenarios using fate models.

Thank you for your attention

