




FOOTPRINT

Identifying contamination pathways in the agricultural landscape




Kick-off meeting
Friday 24 February 2006

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Pathways context



- > Requirements for moving from spatial scenarios to assessing and managing the risk posed by pesticides:
 - Diagnosis tools,
 - at the three scales of the project:
 - farm scale (FOOT-FS),
 - catchment or regional scale (FOOT-CRS),
 - national scale (FOOT-NES).
- > Which diagnostic tools are available and useful?

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Tools and methodologies



- > At the farm scale:
 - the diagnostic approaches of CORPEN (France)
 - Hydrology Of Soil Types: HOST (UK).
- > At the catchment or regional scale:
 - Aquavallée (France),
 - Hydrology Of Soil Types: HOST (UK).
- > At the national scale:
 - Index of hydrological Network Development and Persistence (IDPR).



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The diagnostic method of CORPEN (FOOT-FS)

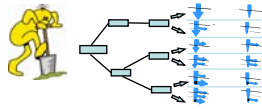


- > To make a diagnostic of each field with the farmer / extension adviser
- > To suggest changes in agricultural practices where appropriate:
 - agronomic practices
 - landscape management (buffers, edges, ditches, tree planting, etc.)
 - choice of spraying periods
 - choice of pesticides and spraying schedule



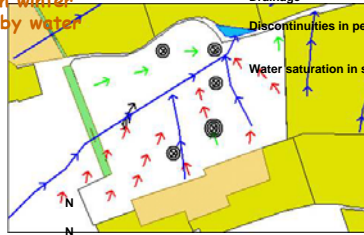
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The diagnostic method of CORPEN (FOOT-FS)



Hydrology categorization at the plot scale

...in the field with a spade and an auger in autumn or in winter when soils are saturated by water

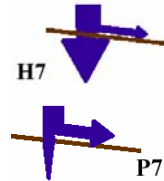


Soil categorization

Soil type	Silty capping soil	
Soil water holding capacity	180 mm	
Deep soil	Y	N
Stones	Y	N
Drainage	Y	N
Discontinuities in permeability	Y	N
Water saturation in soil surface	Y	N

Landscape categorization

Upstream water arrival	Y	N
Runoff concentration	Y	N
Proximity to water body	Y	N
Important slope	Y	N
Buffer zone	Y	N

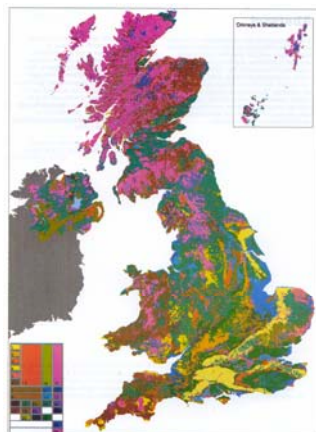


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The HOST methodology (FOOT-FS)



> Hydrology of Soil Types (UK)



Classification of the agricultural land in the UK according to types of water transfers in the landscape

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Main features of HOST



Soils grouped using:

- > Water regime and physical properties to differentiate soil hydrological characteristics;
Substrate lithology to differentiate hydrogeological characteristics.
- > Distribution of soil classes within catchments from 1:250,000 soils maps.
- > 11 basic conceptual models of soil hydrological pathways. Subdivided into 29 classes according to flow and storage characteristics.

The CORPEN methods and HOST are complementary approaches.



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The Aquavallée methodology



- > Catchment or Region Scale (FOOT CRS) :
 - Aquavallée (France),
 - Hydrology Of Soil Types : HOST (UK).
- > Aquavallée is a tool for mapping types of pesticide transfers which uses a GIS and a decision making implementation,
- > The decision rules are adapted from the decision trees of the CORPEN methods.



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AQUAVALLEE : map of transfers

The Péron catchment

Types of transfer	
Impermeable substrate	Permeable substrate
Non agricole	
Saturation runoff	
Subsurface flow	
Flooding	
Leaching towards alluvial sheet	
Flooding (alluvial sheet)	
Drainage network with ditch or pipes	
Saturation runoff towards pits, paths and roads	
Runoff by surface sealing	
Erosive runoff	
Runoff by balance	Runoff by balance
Erosive runoff	Erosive runoff
Subsurface flow	Leaching towards sheet
Saturation runoff	
Diffuse runoff by balance	
Diffuse runoff by balance	Diffuse runoff by balance
Subsurface flow	Leaching towards sheet
Saturation runoff	
Low or unlikely transfer	
Subsurface flow	Leaching towards sheet
Saturation runoff	
Not defined	

Carte des types de transferts diffus de produits phytosanitaires
Bassin versant du Péron

Réalisation : ARVALIS
Edité le 23 Mars 2005

GEOSYS

CORPEN methods and HOST will be linked in FS and CRS

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The IDPR methodology

- > National scale (FOOT NS): IDPR (Index of hydrological Network Development and Persistence),
- > Simplified approach for tendency of a catchment to transfer water to groundwater (infiltration) or to surface water (run off)
- > Based on comparison between actual and conceptual (hypothetical) drainage network

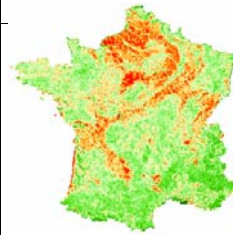
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The IDPR methodology



Areas with an index close to zero (in red) are areas largely contributing to groundwater recharge while those with an index close to 2000 (in green) are zones subject to runoff.

< 1000	Density of conceptualised hydrological network greater than density of observed hydrological network. Contribution to groundwater recharge.
= 1000	Density of conceptualised hydrological network equal to density of observed hydrological network. Contribution to groundwater recharge and to runoff is considered as equal.
> 1000	Density of conceptualised hydrological network lower than density of observed hydrological network. Contribution to runoff.



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Conclusions on pathway identifications



- > State of the art methodologies
- > Identification and illustration of transfer pathways
- > Specific to each scale
- > Focus on providing recommendations

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