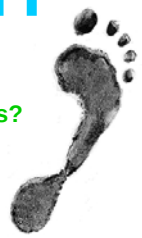
FOOTPRINT

For which applications?



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Water Framework Directive & risk assessments

- Action plans at the farm level
- Quick catchment assessment
- Identification of vulnerable zones
- Estimation of transfer times and contamination dynamics
- Optimisation of monitoring programmes
- Contribution to the identification of priority substances and the setting of EQSs
- Vulnerability assessments
- Link between FOOTPRINT outputs and groundwater and/or surface water models

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Agriculture

- Farm diagnostics
- Identification of problematic crops/fields and practices
- Implementation of risk reduction strategies
- Simple comparison of crop protection programmes
- Detailed comparison of crop protection programmes
- Integration of FOOTPRINT technology into other computerised tools

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Research

- Simple lower tier assessments
- Detailed assessments (ecotox in particular)
- Comparison of outputs against field/monitoring data
- Detailed entries into surface water and groundwater systems

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Pesticide registration

- National registration in EU countries
- Adaptation to national conditions (climate, soils, crops, mitigation strategies)
- Access to non-extrapolated data (time series for leaching, drainage, runoff and erosion)
- Aged sorption, Q10 value

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Other fields of application

- Education
- Awareness building
- Potentially other contaminants: nitrate, phosphorus, pathogens, veterinary medicines

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FOOTPRINT

How are the FOOT tools going to evolve?

Listening to the feedback of end-users

> From what I hear, two main end-user communities whose wishes are not fully fulfilled by the current FOOT tools
  - National registration authorities
  - Water managers involved in the WFD

> National registration authorities
  - We cannot use the FOOTPRINT results directly because
    - We need access to the predicted daily series for drainage, leaching, surface runoff and erosion
    - We need to be able to make detailed assessments with a non-linear Freundlich isotherms, time-dependent sorption, and a bespoke Q10 value
  - BUT you've characterised the diversity of our agricultural landscape and parameterised pesticide fate models for our country
  - SO would there be some potential to use FOOTPRINT to address higher tier risk assessments which would be specific to our country?

Listening to the feedback of end-users

> Water managers / risk assessors / environmental consultants
  - We can use the FOOTPRINT tools to
    - Identify problematic areas in the landscape
    - Decide action plans at the regional level
    - Deploy actions at the farm-scale level to reduce losses to water systems
  - BUT we cannot use the current FOOTPRINT tools
    - to look at transfer times and to identify periods of contamination (because the tools do not include the detailed daily data)
    - to feed detailed FOOTPRINT predictions into our catchment scale model(s) to reach concentration estimates in water bodies
  - And we would like to feed our own climatic data into FOOTPRINT
  - SO can you design a system which would allow us to feed our own data in the system and to access/import the detailed predictions you make?

Does a solution exist?

> Yes it does!

The current FOOTPRINT approach

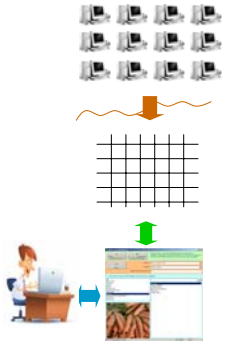
> Pre-modelling
  - We characterise the agro-environmental conditions
  - We do a lot of modelling during the course of the project
  - We then integrate simplified results in the tools

> Advantages
  - Extremely quick to run
  - No access to the internet required
  - Ideally suited to a deployment in the field

> Shortcomings
  - Some simplifying assumptions made
  - The user has little opportunity to do what he really wants
  - No access to the detailed data

Pre-modelling

FOOTPRINT



FOOTPRINT RTM

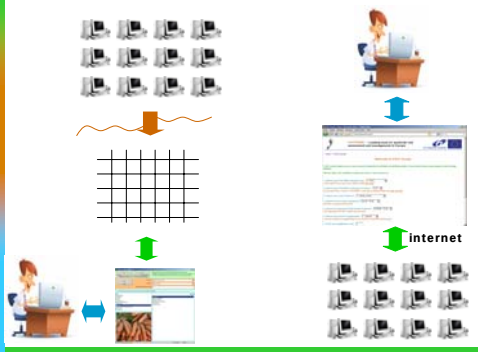
> RTM = Real Time Modelling
- The user uses a web page to specify exactly what he wants (agro-environmental conditions, application dates, pesticide properties)
- The web server sends information to a FOOTPRINT supercomputer…
- …which executes the modelling on a large number of machines…
- … and sends the results back to the user through the web
  - In a digested form
  - In a detailed form with full access to time series and associated statistics

> Advantages
- The user
  - has total control over simulations
  - can access and retrieve detailed predictions
- The web portal can be geographic

> Pitfalls
- Needs a good dimensioning of the supercomputer in the first place or a scalable infrastructure

Modelling on demand = Real-time modelling

Pre-modelling (FOOTPRINT) | Real-time modelling



FOOT-RTM

How long would the user have to wait?

> The modelling effort is much lighter for RTM than for the pre-modelling approach

> Pre-modelling (FOOTPRINT)
- Large number of combination of climates (16), soils (264), crops (42), pesticide properties (144), application dates (12)
- Several millions of runs

> Real-time modelling
- Limited number of climates (3) and soils (50)
- 1 crop
- 1 set of pesticide properties
- 1 application date
- 150 model runs

> The number of processors can be scaled up according to the requirements of the user

> 150 MACRO runs = 30 minutes on ca. 40 computers

> Strong efficacy gains expected by optimising the code of models

> Talking to people, most potential future users of FOOTPRINT RTM are ready to wait for a few hours given all the benefits offered

How far down the line are we?

> We've been playing with submission and results pages

> A first version of the FOOTPRINT supercomputer is already up-and-running

> Still to be done: the link between the FOOTPRINT web server and the FOOTPRINT supercomputer

> We have started discussions with a first national registration authority to have a system up-and-running in early 2010 (i.e. 6 months after the end of FOOTPRINT)

> We are looking at developing collaborations on the WFD side

Other ideas we are discussing

> Porting FOOT-CRS and FOOT-NES to a GIS web server
- Because an ArcGis licence is very expensive
- Because some organisations use alternative GIS software (open source, MapInfo)
- Because running the FOOTPRINT tools requires some expertise in running ArcGIS (prerequisite)

> We'll clearly run out of space before we run out of ideas!

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i.dubus@eu-footprint.org