Improvement of the water quality in the water catchment of Arquennes

Results after 12 years of actions and follow-up
December 1991: vote of the Directive 91/676/CEE on the protection of waters against pollution caused by nitrate from agricultural sources

- Designation of the nitrate vulnerable zones
- Establishment of action programmes and codes of good agricultural practice
- Monitoring of the water quality
- Assessment of the impact of action programmes
- 4-yearly reports
Introduction

The water catchment of Arquennes
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The water catchment of Arquennes
1st stage: understanding and advise

2004 - 2010

Multidisciplinary Partnership

• Agricultural advisors

• Scientists

• Water producer

Objectives

• To advise the farmers for application of the PGDA (the Nitrate Directive in the Walloon region)

• To assess the effects of PGDA on water quality

• If needed to propose solutions.
1st stage: understanding and advise

Advising part

Subjects

• Soil linkage ratio and transfer of manure between farms
  - Amount of N-manure produced by the farm
  - Maximum amount of N-manure spreadable

• Catch crops

• Manure storage capacities

• N fertilization

• Soil nitrogen residue (APL in French)
Objectives

• To assess the PGDA (Walloon implementation of the Nitrate Directive)
• If needed, to propose solutions

Tool: modelling

• characterisation of the water catchment (calibration)
• experimentation (validation)
1st stage: understanding and advise

Scientific part
1st stage: understanding and advise

Scientific part
Evaluation of the nitrate flows

- Vadose zone
- Saturated zone
1st stage: understanding and advise

Scientific part

- Precipitation/snowfall
- Evapo-transpiration (ET)
- Root water uptake
- Recharge
- Vadose zone
- Water table
- Ground water
Objectives:

- Agricultural practices after the “advise period”?
- Trend of the water quality?
- Relation between soil nitrogen residue (APL) and nitrate concentration of the water?
• Yearly soil sampling of all the parcels of the water catchment

• Comparison to references

➔ Assessment of the nitrogen management

2\textsuperscript{nd} stage: follow-up

Agricultural practices?
2nd stage : follow-up

APL – water quality

Mean Soil nitrogen residue (APL) at water catchment scale

Graph showing the trend of APL (kg N-NO₃/ha) from 2005 to 2016.
2nd stage: follow-up

APL – water quality

Trend of the nitrate concentration in the groundwater

- Emergence E2
- Galerie G3
- Galerie G6

Date de prélèvement

mg NO₃-l⁻¹
APL controls in the nitrate vulnerable zone

Contrôle APL 2007 à 2015
Qualification
- Bon
- Satisfaisant
- Limite
- Non conforme

Zone vulnérable
At nitrate vulnerable zone scale

APL – water quality

Mean APL by groundwater body
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Conclusions

• Good acceptance of agricultural advisors

• PGDA applied ➔ Sufficient water quality

• APL : indicator related to water quality
Improvement of the water quality in the water catchment of Arquennes

Results after 12 years of actions and follow-up

on fèl mèrcî di m’awè bin choûté !