1- Location of the river

Belgium (Flemish part)
Between Brussels and Ghent
Main river: Dender
Tributaries (from upstream to downstream):
- Mark
- Molenbeek-G
- Wolfputbeek
- Bellebeek
- Molenbeek 2

2- Diagnosis of the water quality

The flow is highly irregular; it depends basically on rainfalls.
It is studied from the observed data along the stations.

Geraardsbergen and Ninove are the most important towns along the main river.
Their households affect the most to the evolution of DO and BOD.

NO$_3$ values follow the same tendency but are higher for the years after 2010.
The trend for NH$_3$ is lower for the years after 2010.

4- Model calibration

Method: manual iterative trial-error
Calibration period: 2010-2011
Validation period: 2010-2012

Results match comparatively better at the upstream than the downstream sections.
Best calibrated variables: NO$_3$ and DO
Worst calibrated variables: NH$_3$ and BOD

3- Development of the model

Conceptual water quantity model
MIKE 11
Flow, velocity and depth data
Concentration of NH$_3$, NO$_3$, DO and BOD which needs to be calibrated

The conceptual water quality simulator:
- Is based on a dynamic method, analogous to static linear reservoir approach.
- Integrates the mass-balance equation with the transformation/decay processes.
- Uses a quasi-analytical solution, which gives unconditionally stable solutions.

Discharges represented by point source boundaries which indicate the pollutant load (in kg/hr) entering the system.

5- Scenarios

5 scenarios are proposed. The measures taken into account will combine the reduction of pollutant load in the different boundaries, affecting agricultural, domestic and WWTP discharges.

It is intended to reduce the pollutant load by half as an order of the VMM.
Based on the results, the two most beneficial scenarios are chosen.

6- Conclusions

In general, the measures implemented lead to improvement and solve most of the water quality problems.
- The reduction of pollutant load in effluents from the WWTP does not generate a relevant change.
- In contrast, the reduction of contaminant concentration in agricultural and domestic effluents generate a great change.
- As for the variables, the most difficult change to achieve is the increase of DO. The easiest way to get this is by decreasing the pollutant load of the domestic effluent.