

SCHEME, WINNING BACK WATER QUALITY OVER NITRATES.

What will the nitrate concentration be in streams within 10, 15, 20 years from now? Can a reorganization of the landscape induce lower nitrates concentrations? How will a change in agricultural practices affect water quality? What is the impact of global warming on catchments?

These are questions that SCHEME is qualified to answer.

A dynamic and spatial water quality model: TNT2

In order to answer these questions, SCHEME uses the TNT2 model developed by the National Research Institute of Agronomy (INRA). Given its performant capacity to represent the nitrogen cycle on a landscape level, TNT2 is perfectly adapted to treat questions related to water quality management, and more specifically, nitrogen/nitrate issues. Through virtual experimentation, this tool enables to take into account the specificity of the river bassin studied and allows us to test diverse scenarios related to: climate, agricultural practices, temporal and/or spatial organization. The level of spatial discretization

allows an explicit representation of the different elements existing on the landscape: agricultural plots, hedges, wetlands... It is important to take these factors into account, for their location and organization in the landscape can have an influence on the nitrogen cycle process. (e.g. denitrification in wetland areas). Despite the complexity of the model, we have the capacity to generate these calculations quite quickly and enables us to carry out a temporal exploration in accordance with the response time of the catchment system: ranging from 10 to 100 years. Thanks to our calculation cluster, our TNT2 modelling results can be accompanied by confidence intervals which measures the credibility of the predictions.

Why ?

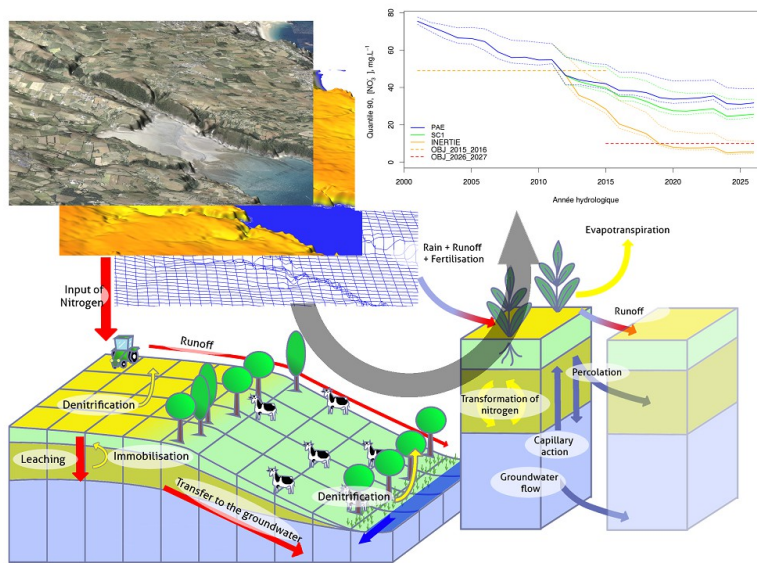
The EU water framework directive enforces European Union member states to achieve good qualitative and quantitative status of all water bodies by 2015. The directive sets a potability threshold of 50 mg of nitrate per liter of water. If member states do not comply, it results in financial penalties.

Results

Our expertise allows testing change scenarios on any territory, to know their impact on environmental quality, productivity of land, on pollution of groundwater and streams and that for the 30 years to come. It is a real support to the strategic decisions adapted to territorial context and the expectations of the prime contractor.

Our tool provides various types of results: time series at the outlet or anywhere in the watershed (flow, nitrate concentration ...), maps showing the instantaneous values, cumulated or averaged nitrate stock in the soil, denitrification rate, crop yields, etc ...

The feedback shows the accuracy of the simulations with TNT2. Indeed, the modeled nitrate concentrations during the contentious 2007



From spatial information to the modelling of concentrations

water in Brittany are very close to those observed today.

Who is concerned?

- Local authorities
- Environmental protection agencies or Water Agencies
- Water authorities
- Agriculture Cooperatives
- Environmental protection and water protection associations
- Environmental consultants
- Community and local governments

References

SCHEME was missionned by INRA and the region of Brittany to predict impacts of scenarios in order to restore water quality for 14 river bassins presenting « green algae problems » in Brittany. Furthermore, SCHEME has acquired a strong experience in New Zealand where they actively participated in developing TNT2 among the National Institute of Water and Atmospheric Research (NIWA).