

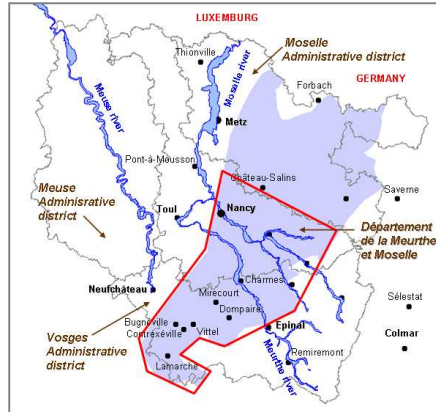
French Case Study Fact Sheet

AquaMoney Policy Brief No. 4-8

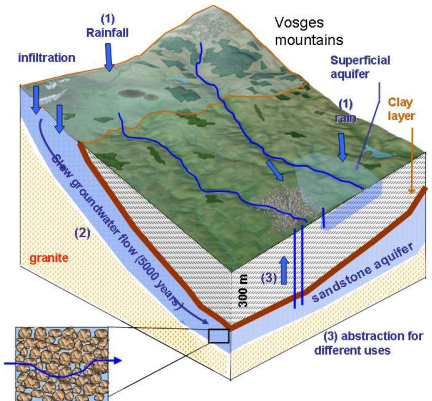
August 2009

The Groundwater Case Study in Eastern France

This case study focuses on specific problems related to economic valuation of groundwater protection benefits. It particularly focuses on a problem of groundwater over-exploitation. The area selected to conduct the case study is located in Eastern France, in the Lorraine region and in the Moselle and Sarre river basin sub-district. It corresponds to the area where the Lower Triassic Sandstone (LTS) confined aquifer shows signs of overexploitation. This aquifer, which is a strategic resource at the regional level, covers approximately one third of the Vosges District (département des Vosges) and half of the Meurthe et Moselle districts.



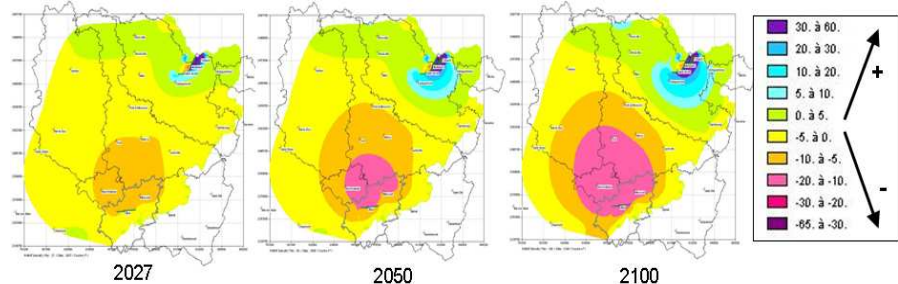
Map of the LTS aquifer.



Representation of groundwater flows for respondents

Environmental situation

Since the development of boreholes in the 1960's, increasing abstraction has led to a decline in water levels of ca. 30 meters. Simulations carried out with a groundwater model show that, with the current rate of pumping, water levels will continue to decline over an area which would progressively expand, drying up a number of wells between 2015 and 2100.



Simulated evolution of water level between 2004 and 2100.

Set up of the survey

The CV was implemented using a mail survey. Six thousand questionnaires were sent to a households sample representative of the diversity of water supply situations. Approximately 10% of the questionnaires were returned. The aquifer and the forecasted groundwater
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evolution were first presented to respondents. A policy scenario was then constructed, based on policy orientations which are currently being defined by a group of local stakeholders. The questionnaire was designed to test three hypotheses: (1) WTP is negatively influenced by the time lag between the date of payment and the date at which benefits actually occur; (2) the presence of substitute resource (for production of drinking water) has a negative influence on WTP; and (3) respondents level of information prior to the survey has a positive influence on WTP.

Public perception of groundwater

A small social survey was first conducted with 72 detailed and semi-structured face to face interviews to characterise the representation lay persons may have of groundwater. The results show that although the public knows little about groundwater in physical terms, they clearly understand that this resource has an economic value. The results of the main survey confirm that households are poorly informed about groundwater and its problems. While 61% of the respondents have never heard about the aquifer or about the depletion problem, only 6% considered themselves well informed about groundwater and the depletion issue.

Willingness-to-Pay

However, in spite of this poor information level, two thirds (67%) of the respondents (430) accept to contribute financially to the implementation of the policy scenario; 36% refuse to contribute (206); less than 1% have no opinion (5); and 1% (6) does not answer this question. The main motivation for paying is related to future use. 64% of the respondents agree with the sentence "I accept to pay because this groundwater is what my grand children will drink in 40 years". This motivation is quoted as the main reason for paying by 36% of the respondents. The average WTP is 39.5 € per year and per household, including valid zero bids, it is equal to **45 €/y/hh** excluding valid zero bids. An econometric analysis is then performed to identify the factors explaining WTP. Several models are estimated, using Ordinary Least Square regressions or Tobit

regression (including true zeros). The main significant variables are the following: income; the perception of drinking water price (expensive or not); the credibility of the reference scenario; the level of concern for future generations; the adoption of water saving practices; and an indicator of warm glow effect.

Sensitivity to the time horizon

Statistical analysis also confirms that time matters. WTP is influenced by the time lag between the date of first payment and the date at which the benefit will take place. In particular, the OLS best reduced model shows that WTP is higher for respondents living in the area where the benefit will take place before 2015.

Sensitivity to prior information level

Respondents' level of information on groundwater has a significant impact on WTP (95% confidence level). Surprisingly, this impact is negative, meaning respondents who discover the problem during the survey are willing to pay more than those who had heard about the problem before reading the questionnaire. This suggests that the information provided in the questionnaire may have a WTP enhancing effect.

Substitute resources

The presence of substitute resources has been found to influence stated willingness to pay in the sub-sample where respondents will benefit from the improvement before 2015. In the other sub-sample (benefits occurring in the longer term, up to 2050) the substitute variable is not significant. This may reflect households' belief that, by the time the problem really takes place (2015 to 2050), the authorities will have time to construct the pipelines required to import water from another place, water being generally abundant in the region. This would be less credible in the area where the problem may take place in the short term, explaining the differing results.

Further information can be found in the Case Study Reports and in further Policy Briefs on:

www.aquamoney.org

