

A SOIL WATER QUALITY OBSERVATION NETWORK FOR STUDYING THE INFLUENCE OF FARMING ACTIVITIES ON WATER QUALITY IN A POROUS MEDIA: A CASE STUDY IN THE LUXEMBOURG SANDSTONE

**J.F. Iffly, F. Barnich, L. Gourdol, C. Hissler,
A. Krein, L. Hoffmann, L. Pfister**

*Public Research Centre – Gabriel Lippmann, Belvaux, Grand-Duchy of Luxembourg
iffly@lippmann.lu*

The major part of drinking water in Luxembourg is provided by the exploitation of the Luxembourg Sandstone aquifer (lower Liassic). This porous media forms a substantial reservoir of good quality groundwater.

The sandy-loamy sandstone plateaus are typically intensively cultivated, mainly with maize, potatoes and cereals, whereas the slopes are covered by forest.

Impermeable marly layers lying underneath the sandstone generate springs that appear in straight lines, parallel to the geologic interface. The outpouring water is systematically collected for drinking water production.

Over the past decades, the quality of the spring water progressively decreased, due to a simultaneous intensification of the agricultural practices.

In order to evaluate the degradation of the spring water quality that is injected into the drinking water supply network of the city of Luxembourg, a database has recently been built up to centralize all relevant data concerning spring water quality and quantity. Intense complementary measurement campaigns have been carried out over the past four years.

Representative landuse configurations were also selected on the sandstone plateaus, in order to study the transfer of elements in the soil profile. Seven sites were retained: four subject to typical farming rotations, one on grassland and two covered by forest (spruce and beech stands). Ceramic suction cups at different depths and open lysimeters plates were installed at each experimental plot, in order to evaluate the impact of agricultural practices in comparison with the natural input signals.

The installation has shown a large vertical heterogeneity in the soil profiles. As a result, a broad range of water volume was collected during the first period.

The obtained results will be of great help in the development of improved farming practices. They will provide input data for the groundwater reservoir model.

