# Land Use Land Cover as a consequence and a driver for soil quality changes

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## Introduction

- Land use and land cover changes are directly related to soil organic matter depletion and water contamination with nitrates.
- Monitoring and regulating land use should integrate impact on water and soil quality to be effective
- Changes in land use are a result of external drivers mainly related to urban growth, agricultural and livestock production policies, aligned with economic growth and food requirement increase.

**Agriculture** **Livestock** **Urban**

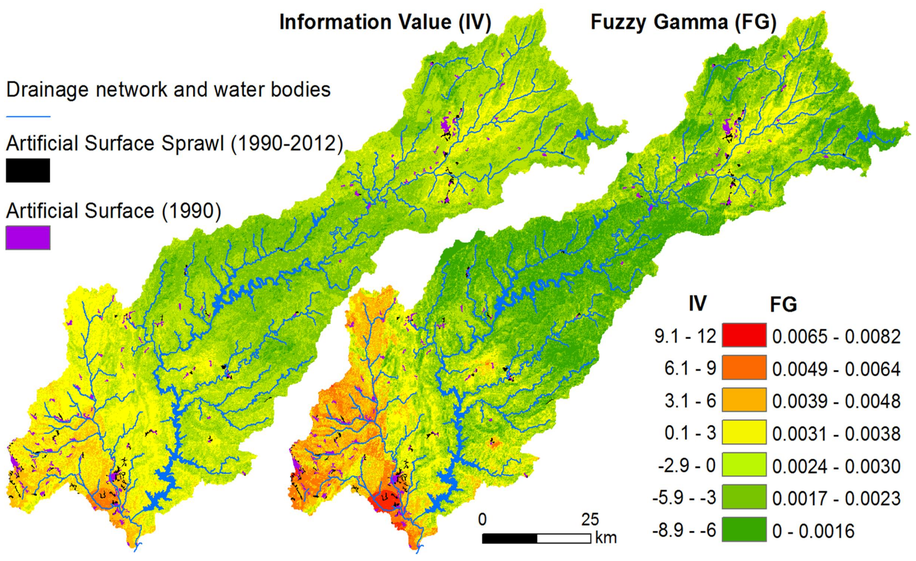
## Objective:

Dynamic evaluation of land use land cover changes impact on water and soil quality .

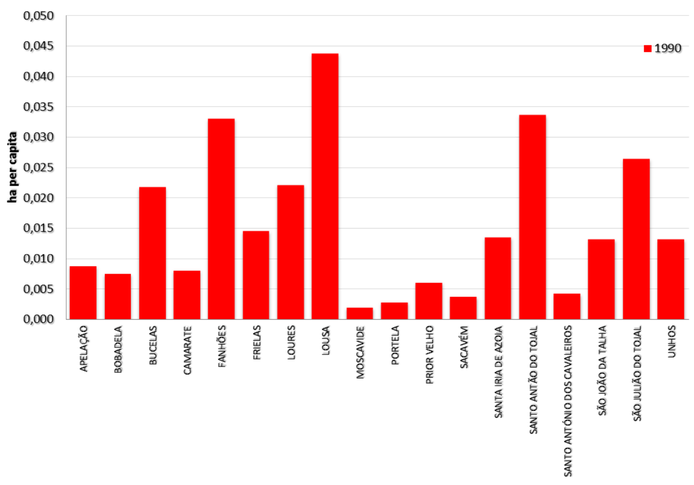
## Methods

- Restructuring data about historical land use land cover uses in Portugal covering the last decades.
- Combining land use related official data sets (Corine Land Cover-CLC and Portugal Land Cover- COS) with population and household data: soil use data and agricultural practices, integrated in official databases, in order to find potential drivers for soil use change impact on water quality determinants related to reactive nitrogen.
- To analyse different datasets, and to use different data management methodologies, in order to select drivers that better explain land use changes related impacts on soil and water quality in Portuguse drinking watersheds mainland (Tagus river basin – Zêzere watershed).

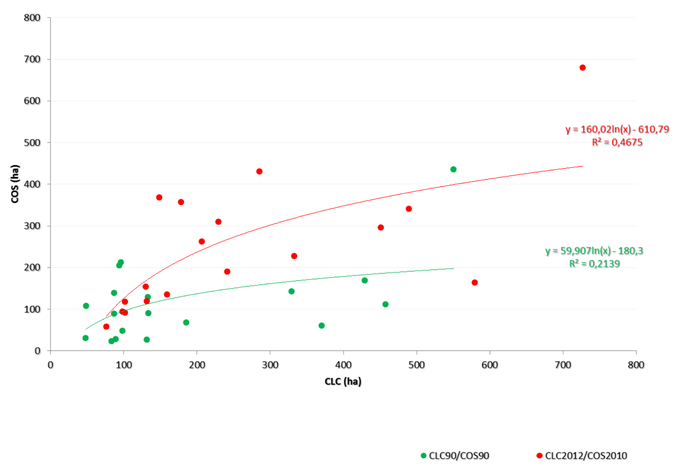
## Results



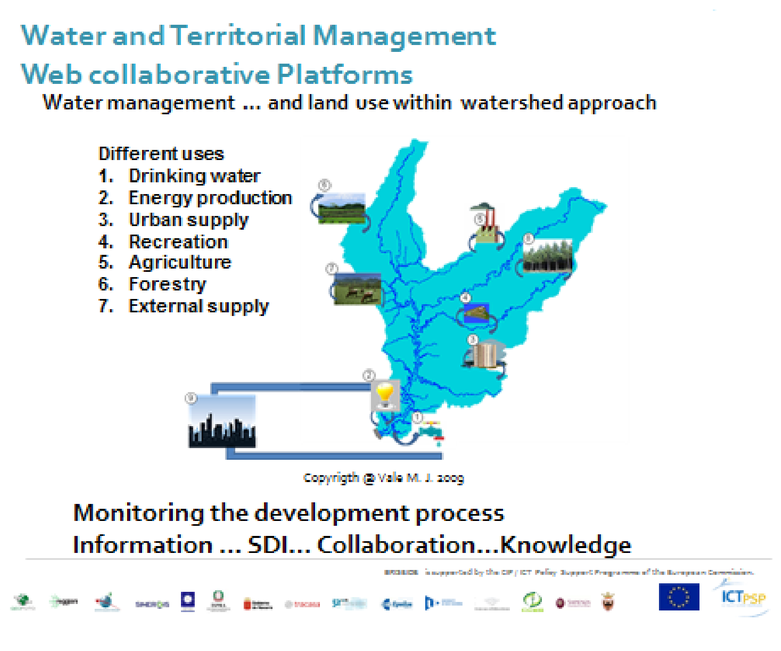

Land use change evaluation (urban/artificial) between 1990 and 2012 for the Zêzere watershed (part of Tagus river basin).



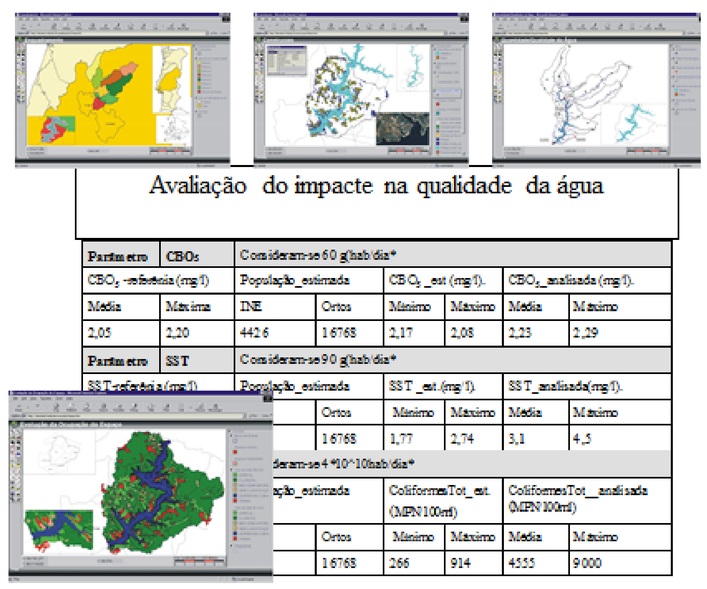

Estimatives for artificial areas per capita (1990) per municipality around the selected watershed (Tagus River- Zêzere watershed).




Esttmating artificial surfaces using different datasets (Portugal Land Cover data- COS, and Corine Land Cover-CLC).




Monitoring soil and water pressures from different uses, impact of different land uses potential drainage into the Zêzere river – Tagus Watershed..




Estimating Impact of urban/artificial areas on water quality monitoring parameters: combined evaluation methods.

## Conclusions

- ✓ Nitrogen pollution from urban, agriculture and livestock discharges is a main environmental pressure on watersheds within the Tagus river basin, namely in the Zêzere case study.
- ✓ Pressure evaluation is particularly relevant in watersheds with drinking water catchment, which is the case of Zêzere, responsible for 1/5 of the Portuguese drinking water supply.
- ✓ Evaluating this pressure is relevant and difficult and must make use of the different available datasets, and monitoring methodologies, combined with different statistical approaches to produce more complete and accurate results.

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