

SUMMARY

Global socioeconomic and climatic changes will increase the pressure on water resources in the Mediterranean region in the next decades. This thesis contemplates the question of how heterogeneously distributed water constraints might foster inter-basins interactions. To do so, it is necessary to assess localised water scarcity in terms of both water quantities and economic values, in a framework combining a river basin level modelling with an extended geographic coverage. The methodological approach used is generic hydroeconomic modelling.

The first part of the thesis is dedicated to the projection and valuation of water demands. For the domestic sector, the approach is to build three-part inverse demand functions, calibrated at the country scale, taking into account structural change. For the agricultural sector, the economic benefits of irrigation water are calculated based on a yield comparison approach between rainfed and irrigated crops.

The second part concentrates on the supply-side of the hydroeconomic model. Operating rules of the reservoirs and water allocation between demands are determined based on the maximisation of water benefits over time and space. A parameterisation-simulation-optimisation approach is used, with hedging parameters and branch allocation parameters optimisation. The model is applied to Algeria, at the 2050 horizon.

The last part explores how this hydroeconomic model could be used to investigate inter-basins issues. In a context of heterogeneous water availability between basins, water dependent activities could relocate from water scarce areas to less constrained locations. The last chapter of the thesis suggests looking at the impacts of water scarcity on economic activities location and population migration in an economic geography framework.